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FORTIETH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1912.



BY AUTHORITY

LANSING, MICHIGAN
WYNKOOP HALLENBECK CRAWFORD CO., STATE PRINTERS
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LETTER OF TRANSMITTAL.

OFFICE OF THE
SECRETARY OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, DECEMBER, 1912.

TO HON. CHASE S. OSBORN, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying report for the fiscal year ending June 30, 1912.

Very respectfully,
ROBERT L. DIXON,
Secretary of the State Board of Health.

MEMBERS
OF THE
MICHIGAN STATE BOARD OF HEALTH.

TERM EXPIRES.

VICTOR C. VAUGHAN, M. D., Ph. D., <i>President</i> , Ann Arbor	January 31, 1913.
AARON R. WHEELER, M. D., <i>Vice-President</i> , St. Louis..	January 31, 1913.
EDWARD L. ABRAMS, M. D., Hancock	January 31, 1915.
CHARLES M. RANGER, A. B., Battle Creek	January 31, 1915.
ROBERT L. DIXON, M. D., <i>Secretary and Executive Officer</i> , Lansing.....	March 31, 1917.
THOMAS M. KOON, M. D., Grand Rapids.....	January 31, 1917.
JOHN H. KELLOGG, M. D., Battle Creek.....	January 31, 1917.

PART I.

REPORT OF THE SECRETARY FOR THE FISCAL YEAR,
JULY 1, 1911, TO JUNE 30, 1912.

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EXTRACTS OF MINUTES OF BOARD MEETINGS.

REGULAR MEETING, HELD AT LANSING, JULY 14, 1911.

The members present were: Vice-President Aaron R. Wheeler, M. D., Thomas M. Koon, M. D., J. H. Kellogg, M. D., C. M. Ranger, A. B., Mr. Geo. S. Harrington, and R. L. Dixon, M. D., Secretary.

Correspondence from United States Senator Chas. E. Townsend, relative to the dredging of Black River, was read before the Board and same placed on file.

The Secretary was instructed to inform the Governor of the contaminated condition of Black River and to urge the Governor to exercise his influence toward having such contamination removed.

Owing to the great number of feeble-minded persons that were found to exist in those states where eugenic experts had been employed, it was unanimously agreed by the Board to employ an expert from the Eugenics Training School, of Long Island, N. Y., for the purpose of conducting a similar study in this State.

A committee was appointed to prepare pamphlets giving instructions to school teachers for the examination of school children as to their eyesight, hearing, teeth, throat and nose, and to solicit the cooperation of the Department of Public Instruction in urging teachers to make these examinations.

Dr. J. H. Kellogg was appointed a delegate to represent this Board at the International Congress on Tuberculosis to be held at Rome, also to represent this Board at the Hygienic Exposition to be held in Dresden sometime in 1911.

REGULAR MEETING, HELD AT LANSING, OCTOBER 13, 1911.

The members present were: President V. C. Vaughan, M. D., Vice-President Aaron R. Wheeler, M. D., Thomas M. Koon, M. D., J. H. Kellogg, M. D., Edward L. Abrams, M. D., C. M. Ranger, A. B., and R. L. Dixon, M. D., Secretary.

Dr. R. L. Dixon was appointed a delegate to represent this Board at a meeting of the Railway Surgeons to be held in Chicago, October 18 and 19, 1911, also to represent this Board at the meeting of the American Public Health Association to be held at Havana, Cuba, December 4-9, 1911.

REGULAR MEETING, HELD AT LANSING, JANUARY 12, 1912.

The members present were: President V. C. Vaughan, M. D., Thomas M. Koon, M. D., C. M. Ranger, A. B., and R. L. Dixon, M. D., Secretary.

Dr. R. L. Dixon was appointed a delegate to the National Council on Public Health to be held at Chicago, February 26-27, 1912.

Mr. J. H. Hach, Jr., representing the Travelling Men's Association,

addressed the Board relative to the insanitary conditions of hotels, and urged the Board to appoint a hotel inspectorship for the State.

REGULAR MEETING, HELD AT LANSING, APRIL 12, 1912.

The members present were: President V. C. Vaughan, M. D., Vice-President A. R. Wheeler, M. D., Thomas M. Koon, M. D., J. H. Kellogg, M. D., C. M. Ranger, A. B., and R. L. Dixon, M. D., Secretary.

Dr. Dixon was appointed a delegate to represent this Board at a meeting of the National Anti-Tuberculosis Association and to attend a conference of the Secretaries of the various State Boards of Health to be held at Washington, May 30, and June 2, 1912.

In accordance with Act 248, P. A. of 1911, the following milk commissions were appointed:

Mason Co.—Drs. E. J. Kirwan, F. W. Graham, E. G. Gray, H. W. Force and W. C. Martin.

Manistee Co.—Drs. H. MacMullen, L. S. Ramsdell, A. S. Paine, G. S. King and E. S. Ellis.

Macomb Co.—Drs. A. J. Warren, Jos. Croman, Albert Parisot, Henry F. Taylor, and Walmer T. Lungerhausen.

Calhoun Co.—No. 1. Drs. E. C. Stewart, J. C. Brown, W. H. Haughey, A. T. Kingsley, and A. S. Kimball; No. 2. Drs. E. L. Parmenter, W. C. Marsh, H. A. Herzer, E. M. Chauncey and H. E. Grant.

Muskegon Co.—Drs. W. A. Campbell, Jacob Oosting, I. M. J. Hotwedt, G. J. Hartman and R. G. Olsam.

Dickinson Co.—Drs. J. S. Crosswell, G. H. Boyce, C. D. Collins, D. E. Coffin and H. A. Newkirk.

Ingham Co.—Dr. M. L. Holm.

EXAMINATION OF PLANS FOR STATE BUILDINGS.

During the fiscal year, ending June 30, 1912, plans for the under-mentioned buildings in connection with State institutions were examined by the State Board of Health and opinions offered thereon, in accordance with the provisions of Section 2229 of the Compiled Laws of 1897:

A dairy house, kitchen extension, infirmary wing and sewage filtration bed, at the State Sanatorium, Howell.—The sewerage of the several buildings not being shown on the plans, no opinion could be offered thereon.

The proposed means for the ventilation of the buildings were not in accordance with the best modern methods, but inasmuch as the windows of rooms in this institution are usually open continuously throughout the year, it was presumed that the ventilation of the rooms in the buildings under consideration would be accomplished by this means.

The plans for the sewage filtration bed showed the same to be a duplicate of a bed, the plans for which were approved by this Board several years previous and were, therefore, approved.

New cottage for the Michigan Home for Feeble-Minded and Epileptic,

Lapeer.—Criticism was made relative to the proposed use of stoneware pipes under the building for the conveyance of the floor washings to the sewers, and to the proposed use of Bell traps for the floor drains.

Recommendations were made relative to the trapping and ventilation of the sewers of the building.

EXAMINATION AND LICENSING OF EMBALMERS.

Under the provisions of Act No. 132, Laws of 1903, one examination was held during the fiscal year ending June 30, 1912, as follows:

Lansing, November 15, 16 and 17, 1911.

Of the 28 persons examined, 16 were granted licenses.

Reciprocal licenses were granted in 19 instances.

A statement of expenses incurred in the operation of Act 132, Laws of 1903, may be found on a subsequent page of Part 1 of this report.

The following letter, issued in November, 1911, will serve to show the scope of the embalmers' examination, and the conditions to be complied with on the part of the applicants for examination:

STATE BOARD OF HEALTH,

OFFICE OF THE SECRETARY, LANSING.

To the Funeral Directors and Embalmers.

GENTLEMEN:

You are hereby informed that a meeting of the State Board of Health, called for the purpose of conducting an embalmers' examination, will be held in the Senate Chamber, Lansing, November 15, 16 and 17, 1911. The examination will commence at 9 o'clock, Wednesday morning, November 15.

Candidates will be required to take both *written* and *oral* examinations with demonstration on the cadaver. Oral examinations will be given in the order applications are received. Some of the general subjects included in the written examinations are:

(a) Visceral anatomy and the circulation of the human body, both arterial and venous.

(b) The nature, action, modes of action and comparative value of disinfectants.

(c) The method of embalming and preparing bodies for transportation, also shipping rules.

(d) How diseases are spread; the best method for the restriction of diseases, and bacteriology in relation to the spread of diseases.

(e) The signs of death and the manner in which it is determined.

Those who desire to take the examination at this time must fill out and return to the Secretary of the Board, the enclosed application blank, with an unmounted photograph of the applicant, signed in ink on the back, and properly certified to by a notary. A fee of five dollars must accompany the application. Remittances may be made by express or postoffice money order or by registered letter. *Personal checks cannot be used.*

Applications should be on file in this office *one week* before the date of examination.

Application must be made in the name of an individual, and not of a firm.

Applicant's name must be signed in full.

In the examination, a rating of at least seventy-five per cent must be made by the applicant to secure a license.

By direction of the State Board of Health.

ROBERT L. DIXON,
Secretary.

GENERAL AND SPECIAL WORK IN THE OFFICE OF THE SECRETARY.

Much of the general work of the office naturally groups itself under three heads: the collection of information, the compilation of information so collected, and the dissemination of such information as will be of service in the restriction and prevention of disease.

COLLECTION OF INFORMATION.

As the local health officer is the principal medium by which this Department may reach and instruct the public in matters pertaining to the prevention of sickness and deaths, the appointment, and the return of the names and postoffice addresses of the health officers, in each year, are matters of more than ordinary interest and importance.

In each year, it is often necessary to make a first, second and third request for information which will place this office in communication with the local health officers, and during the time which is thus used up in corresponding and waiting, an outbreak of a dangerous disease may begin and become widespread before this office can afford the usual assistance to the proper officials in the locality.

It should be said, however, that there is an increasing tendency to comply with the law in this particular, and local boards of health now generally act promptly and co-operate cordially with this Department for the suppression of disease.

Having established communication with the newly appointed local health officers, pamphlets and other publications which may aid them in their work, together with the usual blanks for reports of outbreaks of diseases in their locality, are mailed from this Department. In some instances, considerable correspondence is necessary to instruct the health officials how to properly care for sick and infected persons, and to make reports which will be of value in the compilations for the annual reports and other publications of this Department.

In addition to the collection of the usual information relative to outbreaks of dangerous communicable diseases in this State, special information, upon subjects of public interest and importance, is sometimes asked for and is usually cheerfully furnished by a large number of health officers and other persons from whom the information is sought.

DISSEMINATION OF INFORMATION.

As stated in the preceding paragraph, each newly appointed health officer is supplied, by this Department, with information relative to his duties. This information is contained principally in a pamphlet entitled "Health Officers' Manual," and in pamphlets covering the principal points in the etiology and methods of restriction and prevention of each of the dangerous communicable diseases.

Upon the receipt of information relative to an outbreak of a danger-

ous communicable disease, in addition to the usual instructions and blanks for making the reports, there are mailed to the health officers a sufficient number of pamphlets, relative to the particular disease then present, for distribution to the families and immediate neighbors of the sick person. In this way, the people are educated as to their duty, under the law, and their co-operation with the local health officers often secured.

A pamphlet covering the law respecting nuisances, and containing information relative to their suppression, is published, and distributed among those persons directly interested, when a complaint of a nuisance is made to this Department.

A pamphlet, giving the law and regulations of this Department, respecting the preparation and shipment of dead bodies, is published, and distributed among the licensed embalmers, railroad officials, and other persons interested in the transportation of the dead.

ANNUAL REPORTS.

About 2,500 copies of the annual report are published each year and about 2,400 copies are distributed among the following:

Members and ex-members of the State Board of Health; local health officers; secretaries of state, territorial and provincial boards of health; sanitary journal exchanges; library exchanges; city hospitals and sanatoriums; presidents and secretaries of county medical societies; the State library and the Secretary of State.

PUBLIC HEALTH BULLETINS.

During the fiscal year ending June 30, 1912, the principal subjects treated in the Quarterly Bulletin were as follows:

Third Quarter of 1911.—“What About the Babies,” by the Michigan Department of Health.

Fourth Quarter of 1911.—“Remarks About Medical Supervision of Schools,” by T. M. Koon, M. D.; “The Importance of Recognition by the Teacher of Physically Defective Children,” by W. S. Rankin, M. D.; “The Backward Child,” by J. H. Kellogg, M. D.; “The Mouth and Teeth,” by Russell W. Bunting, D. D. Sc.; “Tuberculosis Among Public School Teachers,” Michigan Department of Health; “Sanitation of School Grounds and Buildings,” by Thos. S. Ainge, S. E.

First Quarter of 1912.—“The Michigan Method of Water Analysis,” by Victor C. Vaughan, M. D.; “The Need of a Hospital for Cases of Advanced Tuberculosis,” by Ralph Apter, M. D.; “Water Purification,” by Prof. Gardner S. Williams; “Eugenics Work in Michigan,” by Adele McKinnie; “The Medical Milk Commission,” by Guy L. Kiefer, M. D.; “Garbage Disposal,” by T. M. Koon, M. D.; “Hotel Sanitation,” by John A. Hach, Jr.; “A Preliminary Report on Some Occupational

Diseases Occurring in Michigan," by A. S. Warthin, M. D.; "Report on the Occurrence of the Fish Tapeworm in Michigan," by A. S. Warthin, M. D.

Second Quarter of 1912.—Constitution and By-Laws of Michigan Health Officers' Association; "Should Venereal Diseases be Reported," by Guy L. Kiefer, M. D.; "The Relation of the Public Health Laboratory to Public Health Work," by M. L. Holm, M. D.; "The Use and Importance of Public Health Laboratories From a Health Officer's Standpoint," by A. F. Fisher, M. D.; "Prevention and Control of Typhoid Fever," by C. C. Slemons, M. D.; "Methods in Garbage Handling (The Cleaner Way)," by P. M. Hall, M. D.; "The Backward Child," by E. K. Herdman, M. D.; "The Relation of the State to the Education of the Defective Child," by D. E. McClure; "Relation of the Farmer to the Health of the City," by R. L. Dixon, M. D.

INVESTIGATIONS MADE BY THE STATE MEDICAL INSPECTORS DURING THE FISCAL YEAR ENDING JUNE 30, 1912.

In addition to his attendance at the regular and special meetings of the State Board of Health and at the examination of embalmers, which were held outside the city of Lansing, the secretary of this Board, as a medical inspector, together with others acting in the same capacity, under Act 293, P. A. 1909, made visits to the under-mentioned localities for the purposes named:

Lapeer, July 6, 1911.—Investigation of an outbreak of smallpox, by E. L. Ward, M. D.

Robies Road (Pine Lake), July 13, 1911.—Investigation of typhoid fever outbreak, by R. L. Dixon, M. D.

Gobleville, July 17-18, 1911.—Investigation of outbreaks of scarlet fever and whooping-cough, by R. L. Dixon, M. D.

Paw Paw, July 23-24, 1911.—Conferring with city council and health officer relative to the contaminated conditions of their lake and on other local propositions, by R. L. Dixon, M. D.

Cadmus, July 24, 1911.—Inspection of creamery, by E. D. Rich.

Clinton, July 25, 1911.—Inspection of sewers, by E. D. Rich.

Detroit, July 27, 1911.—Conference with health officer and Detroit Milk Commission, by R. L. Dixon, M. D.

Flint, July 31, 1911.—Inspection of sewers, by E. D. Rich.

Mayville, August 1, 1911.—Inspection of sewers, by E. D. Rich.

Adrian, Aug. 1, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Hillsdale, Aug. 2, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Coldwater, Aug. 3, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Hastings, Aug. 4, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Three Rivers, Aug. 5, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Niles, Aug. 6, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Lawton, Aug. 7, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Otsego, Aug. 8, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Grand Rapids, Aug. 9-11, 1911.—Investigating sewerage system, and other sanitary work, by R. L. Dixon, M. D.

Saginaw, Aug. 18, 1911.—Conference relative to sewage disposal, by R. L. Dixon, M. D.

Greenville, July 26, 1911.—Investigation of smallpox, by E. L. Ward, M. D.

Boyne City, July 31, 1911.—Investigating outbreak of scarlet fever, by E. L. Ward, M. D.

West Branch, Aug. 3-4, 1911.—Investigating insanitary conditions, by E. L. Ward, M. D.

Coral, Aug. 19-21, 1911.—Investigation of epidemic of diphtheria, by E. L. Ward, M. D.

Algonac, Aug. 23, 1911.—Investigation of smallpox epidemic, by E. L. Ward, M. D.

Lake Resorts, Aug. 16-18, 1911.—Inspection insanitary conditions, by E. D. Rich.

Calumet Township, Sept. 5-10, 1911.—Investigation of leprosy case, by R. L. Dixon, M. D.

Algonac, Sept. 4, 1911.—Investigating smallpox epidemic, by E. L. Ward, M. D.

Presque Isle, Sept. 13, 1911.—Investigation of scarlet fever epidemic, by E. L. Ward, M. D.

Algonac, Sept. 9, 1911.—Investigation of smallpox epidemic, by J. F. Breakey, M. D.

Jackson, Sept. 23, 1911.—Consultation with health officers relative to smallpox epidemic at Algonac, by R. L. Dixon, M. D.

Ann Arbor, Sept. 23, 1911.—Consultation with Dr. Warthin, relative to leprosy case at Calumet, by R. L. Dixon, M. D.

Port Huron, Sept. 25-26, 1911.—To meet city council and other officials relative to sending patient to Howell Sanatorium, by R. L. Dixon, M. D.

Montgomery, Oct. 9, 1911.—Investigation of scarlet fever outbreak, by E. L. Ward, M. D.

Mancelona, Sept. 18-20, 1911.—To investigate and make arrangements for the correction of a condition by which a number of wells were contaminated, by E. D. Rich.

Kalamazoo, Oct. 17, 1911.—Inspection of nuisance due to night-soil being dumped within city limits, by R. L. Dixon, M. D.

Owosso, Oct. 21, 1911.—To confer with local health board regarding nuisances and extension of sewerage system, by R. L. Dixon, M. D.

Riley Township, St. Clair County, Oct. 10, 1911.—Investigation of smallpox epidemic, by E. L. Ward, M. D.

Clifford, Oct. 16-17, 1911.—Investigation of diphtheria epidemic, by E. L. Ward, M. D.

Montgomery, Oct. 15, 1911.—Investigation of scarlet fever epidemic, by E. L. Ward, M. D.

Calumet Township, Sept. 25 to Oct. 9, 1911.—Investigating leprosy, occurrence of fish tapeworm and certain industrial diseases, in the northern peninsula; also making examination of smears from six members of the Jensen family who were supposed to be suffering from leprosy, by A. S. Warthin, M. D.

State of Michigan, Oct. 26, 1911 to May 20, 1912.—Field work in eugenics by Adele McKinnie.

Dimondale, Oct. 31, 1911.—Investigation of diphtheria outbreak, by H. S. Bartholomew.

Windsor Township, Eaton County, Nov. 1, 1911.—Investigation of diphtheria outbreak, by H. S. Bartholomew.

Presque Isle Township, Presque Isle County, Sept. 11-13, 1911.—Investigation of scarlet fever outbreak, by Vasil G. Larke, M. D.

Saginaw, Nov. 20, 1911.—Inspection of alleged nuisances, by R. L. Dixon, M. D.

South Haven, Nov. 21-23, 1911.—Investigation of typhoid fever epidemic, by R. L. Dixon, M. D.

Ada Township, Kent County, Nov. 24, 1911.—Investigation of scarlet fever epidemic, by T. M. Koon, M. D.

Bay City, Nov. 25-26, 1911.—Investigation of scarlet fever epidemic, by Ferdinand Cox, M. D.

Addison, Nov. 29, 1911.—Investigation of diphtheria outbreak, by M. L. Holm, M. D.

Paw Paw, Dec. 1-2, 1911.—Inspection of slaughter house, by R. L. Dixon, M. D.

Sandusky, Nov. 16-17, 1911.—Investigation relative to the establishment of a sanitary sewer system, by E. D. Rich.

Sand Lake, Nov. 28, 1911.—Investigation, on request of local authorities, regarding the emptying of sewage into a lake, by T. M. Koon, M. D.

Williamston, Dec. 8, 1911.—Investigation of smallpox epidemic, by R. L. Dixon, M. D.

Jackson, Dec. 12, 1911.—Investigating source of contamination of ice supply, by R. L. Dixon, M. D.

Battle Creek, Dec. 14, 1911.—Inspection of slaughter house, by R. L. Dixon, M. D.

Bay City, Dec. 18-19, 1911.—Investigation of alleged nuisance caused by the German-American Sugar Factory, by M. L. Holm, M. D.

Marine City, Jan. 3-5, 1912.—Investigation of typhoid fever conditions, by M. L. Holm, M. D.

North Park, Jan. 3-7, 1912.—Investigation of smallpox epidemic, by T. M. Koon, M. D.

Port Huron, Jan. 5, 1912.—Inspections made by E. D. Rich.

Ypsilanti, Jan. 6, 1912.—Inspection made by E. D. Rich.

Jackson, Jan. 2-13, 1912.—Five trips to assist in the control of smallpox epidemic, by R. L. Dixon, M. D.

Montrose, Jan. 6, 1912.—Investigating scarlet fever epidemic, by Geo. L. Alger, M. D.

Jackson, Jan. 19, 1912.—Investigation of smallpox, by R. L. Dixon, M. D.

Port Huron, Jan. 13, 1912.—Inspection of tuberculous persons, by R. L. Dixon, M. D.

St. Louis, Alma and Midland, Jan. 19-22, 1912.—To investigate the method used in disposing of sugar factory wastes and its effect upon the water supply at Midland, by M. L. Holm, M. D.

Rives Junction, Jan. 29, 1912.—To examine a case of alleged smallpox, by M. L. Holm, M. D.

Hudson, Feb. 9-10, 1912.—Investigation of smallpox, by R. L. Dixon, M. D.

Jackson, Feb. 12, 1912.—Investigation of smallpox, by R. L. Dixon, M. D.

Escanaba, Oct. 30 to Nov. 1, 1911.—Medical inspection by E. L. Abrams, M. D.

Saginaw, Jan. 26, 1912.—Inspection of jail, by R. L. Dixon, M. D.

Britton, Jan. 25-27, 1912.—Medical inspection, by Dr. Bartholomew.

Prattville, Feb. 5, 1912.—Investigation of smallpox, by J. H. DeMay, M. D.

Eaton Rapids, Feb. 12, 1912.—Investigation of suspected case of smallpox, by C. C. Slemons, M. D.

Lodi Township, Kalkaska County, Feb. 16, 1912.—Investigation of an outbreak of scarlet fever, by R. L. Dixon, M. D.

Hillsdale, Feb. 18-19, 1912.—To consult with local board of health relative to the smallpox epidemic, by R. L. Dixon, M. D.

Ludington, Feb. 21-25, 1912.—To install emergency hypochlorite plant on account of outbreak of typhoid fever, by E. D. Rich.

Traverse City, Feb. 25, 1912.—Investigation of water supply on account of typhoid fever epidemic, by E. D. Rich.

Cambria, Feb. 28, 1912.—Investigation of alleged case of smallpox, by M. L. Holm, M. D.

Kalamazoo, March 2, 1912.—Investigation of smallpox, by T. M. Koon, M. D.

Jackson, March 19-20, 1912.—Investigation of smallpox, by R. L. Dixon, M. D.

Lennon, March 6, 1912.—Investigation of smallpox epidemic, by Don D. Knapp, M. D.

Eveline Township, Charlevoix County, April 25-26, 1912.—Investigation of outbreak of scarlet fever in the several school districts, by W. E. Tew, M. D.

Reeds Lake, Kent County, May 9, 1912.—Investigating insanitary conditions and giving instructions regarding the disposal of sewage and garbage, by E. D. Rich.

Highland Park, Ottawa County, May 11, 1912.—Investigating insanitary conditions and giving instructions regarding the disposal of sewage and garbage, by E. D. Rich.

Bay City, May 6-8, 1912.—Medical inspections by R. L. Dixon, M. D.

Clarksville, May 20, 1912.—Medical inspections by T. M. Koon, M. D.

Alto, April 24, 1912.—Medical inspections by T. M. Koon, M. D.

Saranac, May 9, 1912.—Medical inspections by T. M. Koon, M. D.

Parma, May 2, 1912.—Investigating an outbreak of smallpox, by M. L. Holm, M. D.

Bay City, May 28, 1912.—Investigation relative to a case of leprosy, by R. L. Dixon, M. D.

Port Huron, May 30, 1912.—Investigating the typhoid fever epidemic, by R. L. Dixon, M. D.

Bay City, May 16-17, 1912.—Investigation of a case of leprosy, by R. L. Dixon, M. D.

Port Huron, June 6-8, 1912.—Investigation of typhoid fever epidemic, by R. L. Dixon, M. D.

Port Huron, May 30 and June 8, 1912.—Investigation of typhoid fever conditions by J. G. VanZwalwenberg, M. D.

Marquette, May 25-30, 1912.—Investigation of typhoid fever epidemic, by T. M. Koon, M. D.

Armada, May 25-26, 1912.—Investigation of outbreak of diphtheria, by M. L. Holm, M. D.

Bay City, May 31, 1912.—Medical inspections by E. D. Rich.

Port Huron, June 1-8, 1912.—Medical inspections by E. D. Rich.

Bay City, May 27-31, 1912, and June 4-5, 1912.—Investigation of a case of leprosy, by Dr. Warthin.

South Haven, June 14, 1912.—Investigation of smallpox epidemic, by Dr. Rockwell.

Fair Grove, June 12, 1912.—Investigation of alleged case of leprosy, by Dr. Goodwin.

Lake Resorts, June 9-13, 1912.—Medical inspections by E. D. Rich.

Bay City, June 11, 1912.—Investigation of the case of leprosy; of the typhoid fever epidemic and the slaughter house, by R. L. Dixon, M. D.

Port Huron, June 21, 1912.—Investigation of typhoid fever epidemic, by R. L. Dixon, M. D.

Hopkins, Allegan County, June 20, 1912.—Investigation of smallpox, by A. H. Rockwell, M. D.

Lowell, June 13, 1912.—Investigating insanitary conditions, by T. M. Koon, M. D.

Grand Rapids Township, Kent County, June 14, 1912.—Inspection of circus grounds, by T. M. Koon, M. D.

Alma, May 15, 1912.—Investigation of scarlet fever epidemic, by A. R. Wheeler, M. D.

Homer, June 28, 1912.—Investigation of smallpox, by R. L. Dixon, M. D.

Lake Resorts, Ottawa County, June 10-13, 1912.—Inspection by A. J. Decker, C. E.

Lake Resorts, Muskegon County, June 22-27, 1912.—Inspection by A. J. Decker, C. E.

Mt. Pleasant, June 28, 1912.—Medical inspections, by A. R. Wheeler, M. D.

REPORT OF WORK IN THE DIVISION OF SANITARY ENGINEERING DURING THE FISCAL YEAR ENDING JUNE 30, 1912.

Much of the work in this Division is carried on by correspondence and, occasionally, by telephone, detailed statements of which cannot be given in this report for lack of space.

One of the important lines of work in the Division is the examination of plans for the warming, ventilation and sewerage of the buildings at State institutions, particulars of which are printed on a preceding page.

Upon request of school authorities and the State Board of Correction and Charities, plans for school buildings and the buildings of County institutions have also been examined and opinions given thereon.

Up to the end of November, 1911, when he left the Department, Thos. S. Ainge, the Sanitary Engineer, was acting as State Medical Inspector, and a considerable portion of his time while acting in that capacity was taken up in the making of investigations relative to nuisances, and the needs of localities in regard to sewerage, water supplies, and the warming and ventilation of school buildings. A list of the localities visited for these purposes follows:

Portland, July 3, 1911.—Inspection of the high school and conference with the school board relative to a system of ventilation for same.

St. Johns, July 5, 1911.—Investigation relative to the contamination of the public water supply.

Cadmus, July 7-8, 1911.—Investigation relative to a nuisance from the improper disposal of the wastes from a creamery.

Cadmus, July 13-14, 1911.—Conference with the president of the Clover Leaf Creamery relative to the disposal of wastes from the creamery.

Clio, July 17, 1911.—Investigation of insanitary conditions in the village.

East Lansing, July 19, 1911.—Investigation relative to a nuisance from the dumping of rubbish in a low place on Charles Street.

Flint Township, July 21, 1911.—Investigation relative to the dumping of garbage and waste matters on the farm of R. W. Tupper.

Paw Paw, July 23-24, 1911.—Assisting the secretary of this Board in an investigation of insanitary conditions in the village.

Fremont, July 26-27, 1911.—Investigation relative to the contamination of Fremont Lake by the wastes from the plants of the Fremont Canning Company and the Fremont Leather Company and by the village sewage.

Railroad stations on the Lake Shore & Michigan Southern, Michigan Central, and Cincinnati Northern railways, in southern and southwestern Michigan, August 1-12, 1911.—Inspection of the outhouses.

St. Johns, August 14, 1911.—Conference with the city engineer relative to proposed changes in the sewer system for the protection of the public water supply.

Kalamazoo Township, August 16, 1911.—Investigation relative to a nuisance from the improper disposal of night-soil by the city of Kalamazoo.

East Lansing, August 17, 1911.—Inspection of the dump on Charles

Street which was declared a nuisance by this Department on July 19.

Vassar, August 21, 1911.—Conference with the village authorities relative to sewerage for the village and toilet rooms for the schoolhouse.

Romeo, August 22, 1911.—Conference with the school authorities relative to the sanitation of two schoolhouses.

Salem, August 25, 1911.—Investigation relative to an alleged nuisance from the disposal of the wastes from the plant of the Detroit Creamery Company.

Leslie, August 26, 1911.—Investigation relative to complaints of nuisance from the stock yards, and the general insanitary condition of the village.

East Lansing, August 29, 1911.—Inspection of the dump on Charles Street which was declared a nuisance by this Department in July.

Comstock, August 31, 1911.—Conference with the school authorities relative to the sanitation of the schoolhouse.

Kalamazoo, August 31, 1911.—Conference with city officials relative to the disposal of night-soil.

Kalamazoo, September 4, 1911.—Inspection of two sites selected by the city authorities for the disposal of night-soil.

Dundee, Blissfield, Deerfield, Petersburg and Palmyra, September 7-9, 1911.—Investigation of nuisance from the River Raisin.

Hamtramck, September 13-14, 1911.—Conference with the school board relative to the sanitation of a proposed new building for which plans had been prepared which were not in accordance with modern sanitary methods of warming, ventilation, etc.

Eaton Rapids, September 15, 1911.—Investigation relative to a bad condition of the river due to the improper disposal of sewage.

Standish, September 21-22, 1911.—Investigation of insanitary conditions in the city.

Detroit, September 18-19, 1911.—Installation of the State Board of Health Exhibit in the State Fair.

Hillsdale, September 23, 1911.—Planning for the installation of the State Board of Health Exhibit at the County Fair.

Chicago, September 28-30, 1911.—Conference of State and Provincial Health Officials on the question of prevention of the pollution of the Great Lakes and tributaries.

Lansing, October 2, 1911.—Inspection of cellars flooded by sewage in the west part of the city.

Eaton Rapids, October 16, 1911.—Conference with city officials relative to sewerage, and inspection of premises where a number of cases of typhoid fever had occurred.

Lansing Township, October 19, 1911.—Investigation relative to a nuisance from an open ditch in Leslie Park Addition through which a large quantity of the city sewage flows.

Lansing, October 24, 1911.—Investigation relative to a nuisance from sewage in the cellars on Washtenaw Street, W.

Leavitt Township, Oceana County, October 27 and 28, 1911.—Investigation relative to a nuisance from a large swamp, and inspection of the yards and alleys in the business section of the village of Walkerville.

South Haven, November 22-24, 1911.—Investigation relative to the causes of typhoid fever in that city, and inspection of proposed new sources of water supply.

LABORATORY REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1912.

Dr. R. L. Dixon, Secretary State Board of Health:

Dear Doctor: I beg herewith to submit to you a report of the work done at the laboratory for the fiscal year ending June 30, 1912.

SUMMARY OF EXAMINATIONS FOR YEAR ENDING JUNE 30, 1912, COMPARED WITH SUMMARY OF EXAMINATIONS FOR YEAR ENDING JUNE 30, 1911.

	1912.	1911.
Total number of examinations	5,293	3,699
Chemical and bacteriological examinations of water for potability	644	401
Sputa and other discharges examined for tubercle bacilli	2,480	1,877
Throat swabs examined for diphtheria bacilli.....	873	513
Blood samples examined for Widal's reaction	632	385
Chemical and microscopical examinations of urine	145	166
Pathological examinations of feces	16	5
Pathological examinations of tumors	44	13
Miscellaneous blood examinations	43	63
Chemical and bacteriological examinations of milk....	114	23
Examinations for venereal disease	53	66
Toxicological and Medico-legal examinations.....	71	15
Other miscellaneous examinations	178	171

SUMMARY OF EXAMINATIONS ARRANGED BY MONTHS.

Month.	Waters.		Sputa. Tuberculosis.		Throat Swabs. Diphtheria.		Blood. Widal's Reaction.		Smears. Venereal.		Miscellaneous.	Total.
	Safe.	Unsafe.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		
July, 1911.....	17	29	51	99	5	24	18	28	1	3	24	299
August, 1911....	13	46	85	117	17	15	32	71	0	2	20	418
September, 1911	17	35	54	119	20	26	27	42	1	1	28	370
October, 1911...	15	30	48	131	27	30	25	30	2	6	28	372
November, 1911.	16	28	39	124	39	63	16	33	2	2	42	404
December, 1911.	18	14	53	140	40	56	9	34	1	3	45	413
January, 1912...	15	13	62	130	61	123	6	25	2	1	49	487
February, 1912..	28	17	63	175	27	92	5	16	0	6	72	501
March, 1912....	27	12	51	182	15	52	11	25	1	1	62	439
April, 1912.....	34	13	60	199	3	36	21	43	2	2	105	518
May, 1912.....	35	29	55	197	14	58	13	37	2	7	61	508
June, 1912	88	55	48	198	7	23	18	47	2	3	75	564
Total.....	323	321	669	1,811	275	598	201	431	16	37	611	5293

SUMMARY OF WATER EXAMINATIONS FOR THE YEAR ENDING
JUNE 30, 1912.

Localities.	Total examined.	Safe.	Unsafe.
Allen	10	2	8
Athens	1	1	0
Battle Creek	4	3	1
Bay City	5	5	0
Bear Lake	1	1	0
Beaverton	1	0	1
Bellevue	6	4	2
Benton Harbor	10	9	1
Benzonia	2	1	1
Beulah	2	1	1
Birmingham	1	0	1
Black River	2	0	2
Blissfield	33	7	26
Boyne City	2	0	2
Brown City	1	1	0
Cadillac	5	4	1
Calumet	2	0	2
Caro	1	0	1
Caseville	2	0	2
Cassopolis	1	0	1
Centreville	1	1	0
Charlotte	1	0	1
Chesaning	1	0	1
Clayton	1	0	1
Clarkston	1	0	1
Clio	1	1	0
Coloma	5	5	0
Comstock Park	1	0	1
Concord	3	0	3
Coopersville	1	1	0
Darragh	2	2	0
Detroit	2	1	1
Dansville	1	1	0
Dollar Bay	1	1	0
Dowagiac	1	1	0
Dowling	2	0	2
Drenthe	1	0	1
Dundee	4	2	2
East Lansing	1	1	0
East Saugatuck	1	0	1
Elberta (South Frankfort)	18	4	14
Elk Rapids	6	4	2
Farmington	1	1	0
Flint	5	3	2
Flushing	1	0	1
Frankfort	2	2	0
Fremont	1	1	0
Galien	1	1	0
Ganges	4	2	2
Grand Ledge	4	2	2
Grand Rapids	3	2	1
Grayling	1	1	0
Hancock	9	6	3
Haslett	4	0	4
Hastings	2	0	2
Hillsdale	1	1	0
Holland	1	0	1
Honor	2	1	1
Houghton	8	2	6

Localities.	Total examined.	Safe.	Unsafe.
Howard City	6	4	2
Howell	3	3	0
Hudson	1	1	0
Ida	1	0	1
Imlay City	3	0	3
Ionia	1	1	0
Iron Mountain	4	2	2
Ironwood	3	3	0
Jenison Park	1	0	1
Kalamazoo	18	13	5
Lacota	1	1	0
Lake City	2	2	0
L'Anse	1	1	0
Lambertville	1	0	1
Lansing	30	14	16
Lapeer	1	0	1
La Salle	1	0	1
Lee	1	0	1
Leonidas	1	0	1
Leslie	4	3	1
Ludington	28	16	12
Lupton	2	0	2
Lyons	3	2	1
Macatawa	1	1	0
Mason	4	1	3
Manistee	1	1	0
Marquette	21	19	2
Menominee	1	0	1
Midland	6	3	3
Moorestown	1	1	0
Muskegon	3	2	1
Muskegon Hgts.	1	1	0
Nashville	12	7	5
Neebish	1	0	1
Negaunee	14	11	3
New Haven	10	9	1
Niles	4	1	3
Northport	1	0	1
Norway	2	2	0
Olivet	4	3	1
Ontonagon	24	6	18
Otsego	1	1	0
Ottawa Beach	1	1	0
Onsted	2	1	1
Ovid	1	1	0
Parma	1	1	0
Paw Paw	2	1	1
Pigeon	2	1	1
Pinconning	1	1	0
Plainwell	1	1	0
Plymouth	1	1	0
Pontiac	7	2	5
Port Huron	25	16	9
Portland	17	2	15
Reed City	1	1	0
Remus	4	0	4
Rives Junction	1	1	0
Saginaw	25	17	8
St. Clair	12	5	7
St. Johns	11	7	4
St. Louis	3	0	3
St. Joseph	3	2	1

Localities.	Total examined.	Safe.	Unsafe.
Saline	4	1	3
Saugatuck	1	1	0
Sault Ste. Marie.....	4	0	4
Sebewaing	1	1	0
South Haven	48	23	25
Stevens	1	0	1
Strong's	1	1	0
Swan Creek	1	0	1
Tawas City	3	1	2
Three Rivers	5	3	2
Traverse City	3	1	2
Tower	1	0	1
Union City	2	1	1
Vermontville	3	2	1
Vulcan	6	2	4
Watersmeet	3	0	3
Weston	2	0	2
Williamsburg	1	0	1
Williamston	1	0	1
Unknown	3	1	2

SUMMARY OF SPUTA EXAMINATIONS.

Total number of sputa examined for tubercle bacilli.....	2,480
Total number positive	669
Total number negative	1,811

Other organisms associated with tubercle bacilli in sputa:

Streptococci, 40.
 Staphylococci, 22.
 Pneumococci, 17.
 B. Influenza, 1.
 Micrococcus Catarrhalis, 3.
 Other organisms absent or not identified, 586.

Other organisms predominating where tubercle bacilli were absent:

Streptococci, 168.
 Staphylococci, 151.
 Pneumococci, 151.
 B. Influenza, 105.
 Micrococcus Catarrhalis, 4.
 Other organisms absent or not identified, 1,318.

SUMMARY OF THROAT SWABS EXAMINED.

Total number of throat swabs examined.....	873
Total number showing B. Diphtheria	275
Total number showing absence of B. Diphtheria.....	598
Total number of throat swabs examined for release from quarantine	261
Total number showing B. Diphtheria present.....	92
Total number showing B. Diphtheria absent.....	169

Total number of throat swabs examined for diagnosis.....	612
Total number showing B. Diphtheria present.....	183
Total number showing B. Diphtheria absent	429
Total number of throat swabs examined from cases where previ- ous diagnosis of diphtheria had been made from clinical findings	138
Total number showing B. Diphtheria present	86
Total number showing B. Diphtheria absent	52
Per cent of cases of clinical diphtheria not caused by B. Diphtheria	38
Total number of throat swabs examined where clinical diagnosis was regarded as questionable	322
Total number showing B. Diphtheria present.....	84
Total number showing B. Diphtheria absent	238
Per cent of questionable cases found to be diphtheria.....	26
Total number of throat swabs examined from cases where previ- ous diagnosis other than diphtheria had been made.....	150
Total number showing B. Diphtheria present.....	16
Total number showing B. Diphtheria absent	134
Per cent found to be diphtheria	12

Other organisms identified when associated with B. Diphtheria in swabs examined for diagnosis:

Staphylococci, 5.
 Bacillus Fusiformis, 22.
 Pneumococci, 6.
 Micrococcus Catarrhalis, 4.
 Streptococci, 4.

Other organisms found to predominate in cases that were considered diphtheria clinically but not diphtheria bacteriologically:

	Swab.	Culture.
Streptococci	11	17
Staphylococci	7	19
Pneumococci	2	1
Micrococcus Catarrhalis	2	0
Bacillus Fusiformis	12	0
Bacillus Mucosus Capsulatus	0	1
Leptothrix Buccalis	1	0
Unidentified	5	0

Bacillus Fusiformis was found to predominate in direct smear from swabs 104 times. The cultures from these smears showed the follow-
ing:

Streptococci, 32.
 Staphylococci, 34.
 Bacillus Diphtheria, 22.
 Micrococcus Catarrhalis, 1.
 Pneumococci, 13.
 Bacillus Mucosus Capsulatus, 2.

Organisms found to predominate in negative cases of suspected diphtheria:

	Swab.	Culture.
Streptococci	94	162
Staphylococci	49	173
Pneumococci	37	45
Micrococcus Catarrhalis	28	12
Bacillus Influenza	1	1
Bacillus Fusiformis	85	0
Bacillus Coli	0	1
Saccharomyces Albicans	1	7
Leptothrix Buccalis	2	1
Bacillus Mucosus Capsulatus	0	7
No organisms present or not identified....	132	20

Respectfully submitted,

M. L. HOLM.

FINANCIAL STATEMENT.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE
BOARD OF HEALTH (UNDER PUBLIC ACT NO. 18 OF 1905),
DURING THE FISCAL YEAR ENDING JUNE 30, 1912.

Expenses of Members:	
Attending regular meetings	\$127 20
Other expenses	92 53
Engraving, drawing, etc.....	74 41
Instruments and books	225 02
Paper, stationery, etc.	1,841 33
Postage	1,201 90
Printing and binding.....	2,421 48
Secretary	2,500 00
Miscellaneous	515 41
Total	<u>\$8,999 28</u>

NOTE.—The appropriation (\$9,000.00) at the disposal of the State Board of Health for certain specified purposes, does not include clerk hire. The account of the appropriation (\$10,000.00) for clerk hire is kept in the Auditor General's department, and is published in his annual report.

Respectfully submitted,
R. L. DIXON,
Secretary.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE
BOARD OF HEALTH (UNDER SECTION 7 OF ACT 132, LAWS OF 1903, AS
AMENDED BY ACT 151, LAWS OF 1907), EMBALMERS' FUND, AS
ALLOWED DURING THE FISCAL YEAR, 1912.

RECEIPTS.	DISBURSEMENTS.
Fees from applicants for licenses and for renewals of licenses	Expenses of members attending meetings
\$939 59	\$208 38
	Instruments and books.....
	40 50
	Paper, stationery, etc.....
	80 91
	Postage
	280 00
	Printing and binding.....
	133 83
	Drawing, engraving, etc.....
	7 46
	Compensation of extra clerks
	100 00
	Miscellaneous
	81 82
	Unexpended balance, turned over to State Treasurer...
	6 69
Total receipts	Total disbursements.....
\$939 59	\$939 59

Approved: (Oct. 23, 1912),
R. L. DIXON,
Secretary.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE
BOARD OF HEALTH, BACTERIOLOGICAL DIVISION, (UNDER SECTION
5 OF ACT 122, LAWS OF 1909), AS ALLOWED DURING THE
FISCAL YEAR ENDING JUNE 30, 1912.

RECEIPTS.	DISBURSEMENTS.
State Treasurer by appropri- ation \$5,000 00 Fees for chemical, bacterio- logical and toxicological ex- aminations 770 56	Salaries of bacteriologist and assistant \$3,325 00 Salaries of clerks..... 1,111 58 Postage 123 00 Laboratory supplies 1,001 86 Freight and express..... 27 21 Books 33 75 Paper and printing..... 42 34 Traveling expenses 100 41 Miscellaneous 5 40 Unexpended balance, turned over to State Treasurer... 01
Total receipts \$5,770 56	Total disbursements..... \$5,770 56

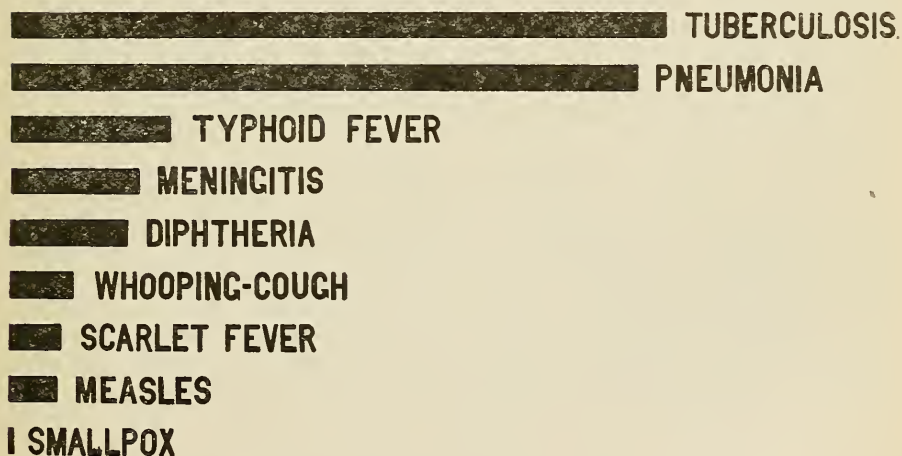
PART II.

COMMUNICABLE DISEASES IN MICHIGAN DURING
THE YEAR ENDING DECEMBER 31, 1911,
AND PRECEDING YEARS.

INTRODUCTION.

This article is the thirty-first in a series upon the same general subject, begun in 1882. It presents a summary of the compilation of the reports received from health officers relative to certain communicable diseases in Michigan during the year 1911, together with a review of some of the information obtained from similar compilations in preceding years. The most dangerous diseases are treated in detail in the order of their importance as causes of deaths, as shown by the diagram below. (Compiled from the Annual Report of Vital Statistics.)

DEATHS IN MICHIGAN, 14 YEARS, 1898-1911.



SOME OF THE PURPOSES OF THIS COMPILATION.

In the law establishing the State Board of Health, the secretary of the Board is required to collect information concerning vital statistics and knowledge respecting diseases, and to disseminate such information among the people. In compliance with this requirement, it is the custom to collect, compile, tabulate and publish information relative to the causes, and methods of prevention and restriction, of the dangerous communicable diseases, under the following general heads: The general prevalence of the disease; the geographical distribution of the disease; the comparative prevalence of the disease in urban and rural localities; the reported sources of contagium in some of the diseases, and the restrictive and preventive measures in some of the diseases.

METHODS OF COMPILATION.

With the exception of pneumonia, tuberculosis, meningitis and typhoid fever, which have been studied by individual cases, the diseases have been compiled by *households*, instead of by *outbreaks* as in the past.

A *household* report is intended to include all the cases which occur in a house, or other place of abode, at or about the same time. When a period of over sixty days has elapsed since the last death or recovery in a household, should the disease reappear in the household and the source of contagium cannot be traced to the previous cases, a separate compilation is made of the subsequent cases. It will be seen, therefore, that it is quite possible for a particular disease to appear in the same household several times during any year and to be counted as one or as several households in the compilation, according to the circumstances attending the outbreaks.

GENERAL PLAN OF THE REPORTS.

Upon the receipt of information at this office that tuberculosis, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, German measles (rotheln), rabies or glanders was present, or had recently been present, in any locality in the State, a letter was sent to the health officer, or, in his absence, to the president of the board of health, mentioning the reported existence of the disease within his jurisdiction, indicating his duties and powers, and the proper measures to be taken in restricting the disease, transmitting documents of instruction relative to the prevention and restriction of the disease for distribution among the neighbors of families in which the disease is present, and asking for reports relative to the methods employed for the restriction of the disease, the results of efforts for suppressing it and the number of cases and deaths in each outbreak. With this letter, in each instance, except in the case of rabies and glanders, there was sent a sufficient number of blanks for the preliminary and final reports.

The information contained in the several reports together with other correspondence relative to outbreaks of such diseases, are the basis on which the statements made in this article are founded.

PNEUMONIA IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

By reference to Table 1, it may be seen that pneumonia was less prevalent in 1911 than in 1910, but the prevalency in 1911 was practically the same as the average for the past several years. While the number of non-fatal cases reported in 1911 was less than in 1910, still we believe, and with good reason, that there existed a greater number of non-fatal cases than was reported to this Department. This condition is probably due, in part, to the fact that pneumonia is not regarded as being a communicable disease by a large number of physicians.

At the present time this Department gets its first information of cases of pneumonia from the death certificates returned to the Secretary of State's Department.

TABLE 1.—*The prevalence of pneumonia, in Michigan, in each of the eight years, 1904-1911.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 of the population.
1904.....	2,530,016	3,790	2,903	114.7
1905.....	2,557,275	3,227	2,636	103.1
1906.....	2,584,533	3,387	2,839	109.8
1907.....	2,611,792	3,976	3,159	121.0
1908.....	2,639,050	3,177	2,502	94.8
1909.....	2,666,309	3,142	2,563	96.1
1910.....	2,810,173	3,671	3,016	107.3
1911.....	2,856,866	3,452	2,887	101.1
Average per year.....	2,657,002	3,478	2,813	105.9

*Estimated for intercensal years.

†From a large number of localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

GEOGRAPHICAL DISTRIBUTION OF PNEUMONIA.

In the consideration of this phase of the study of pneumonia, the State is divided into eleven geographical divisions, the counties in each of which would be likely to have somewhat similar climatic conditions. Judging from the death rates of the several divisions shown in Table 2, pneumonia was more prevalent in the Southeastern Division and least prevalent in the Southwestern Division, which condition has held true for a period of years; or, arranging the divisions in the order of greatest death rates per 100,000 inhabitants we have the Southeastern (155.5), Upper Peninsular (100.4), Western (99.4), Southern Central (95.8), Bay and Eastern (94.3), Central (90.9), Northern Central (87.8), Northwestern (87.0), Northern (84.0), Northeastern (82.6), and Southwestern (78.6). Compared with the average death rate for the State as a whole (105.9), the counties in which the disease was unusually prevalent for the eight years, 1904-1911, are: Wayne (167.8), Huron (120.8), Kalamazoo (117.7) and Muskegon (117.2).

TABLE 2.—*The geographical distribution of pneumonia, in Michigan, in the eight years, 1904-1911, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living in each geographical division shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.....	295,736	374	297	100.4
Alger county.....	7,157	8	8	111.8
Baraga county.....	5,749	5	5	87.0
Chippewa county.....	23,130	31	24	103.8
Delta county.....	29,345	34	33	112.5
Dickinson County.....	19,857	18	16	80.6
Gogebic county.....	19,194	19	18	93.8
Houghton county.....	77,496	103	87	112.3
Iron county.....	10,584	13	11	103.9
Keweenaw county.....	5,876	14	5	85.1
Luce county.....	4,337	5	5	115.3
Mackinac county.....	8,773	8	7	79.8
Marquette county.....	41,256	66	40	97.2
Menominee county.....	25,971	27	25	96.3
Ontonagon county.....	8,022	11	6	74.8
Schoolcraft county.....	8,989	12	7	77.9
NORTHWESTERN DIVISION.....	94,267	131	82	87.0
Benzie county.....	11,267	13	11	97.6
Grand Traverse county.....	24,636	28	21	85.2
Leelanau county.....	10,894	11	8	73.4
Manistee county.....	26,721	54	26	97.3
Wexford county.....	20,749	25	16	77.1
NORTHERN DIVISION.....	90,433	101	76	84.0
Antrim county.....	15,237	17	15	98.4
Charlevoix county.....	18,146	22	13	71.6
Cheboygan county.....	18,239	20	16	87.7
Crawford county.....	4,303	5	3	69.7
Emmet county.....	18,993	22	16	84.2
Kalkaska county.....	7,963	6	6	75.3
Otsego county.....	7,552	9	7	92.7
NORTHEASTERN DIVISION.....	65,378	65	54	82.6
Alcona county.....	6,936	6	4	57.7
Alpena county.....	20,507	19	18	87.8
Iosco county.....	10,465	8	8	76.4
Montmorency county.....	3,712	5	4	107.8
Ogemaw county.....	9,699	12	10	103.0
Oscoda county.....	2,123	5	2	94.2
Presque Isle county.....	11,936	10	8	67.0
WESTERN DIVISION.....	293,760	354	292	99.4
Kent county.....	148,196	180	158	106.6
Lake county.....	5,003	5	3	60.0
Mason county.....	20,549	25	20	97.3
Muskegon county.....	38,399	49	45	117.2
Newaygo county.....	18,988	19	13	68.5
Oceana county.....	18,399	21	18	97.8
Ottawa county.....	44,226	55	35	79.1
NORTHERN CENTRAL DIVISION.....	109,335	136	96	87.8
Clare county.....	9,592	11	6	62.6
Gladwin county.....	9,505	7	7	73.6
Isabella county.....	24,434	40	21	85.9
Mecosta county.....	19,789	24	19	96.0
Midland county.....	14,558	16	14	96.2
Missaukee county.....	10,807	13	12	111.0
Osceola county.....	18,798	21	15	79.8
Roscommon county.....	1,852	4	2	108.0

*† These footnotes are below Table 1, on a preceding page.

TABLE 2.—CONCLUDED.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.....	351,134	396	331	94.3
Arenac county.....	10,207	9	9	88.2
Bay county.....	65,247	75	69	105.8
Huron county.....	35,274	33	28	79.4
Lapeer county.....	26,498	47	32	120.8
Saginaw county.....	88,737	89	81	91.3
Sanilac county.....	34,525	34	27	78.2
St. Clair county.....	54,935	67	53	96.5
Tuscola county.....	35,711	42	32	89.6
CENTRAL DIVISION.....	323,415	391	294	90.9
Barry county.....	21,960	27	20	91.1
Clinton county.....	24,679	28	19	77.0
Eaton county.....	30,199	41	32	106.0
Genesee county.....	49,130	70	57	116.1
Gratiot county.....	30,375	36	27	88.9
Ingham county.....	48,011	55	38	79.1
Ionia county.....	34,475	38	32	92.8
Livingston county.....	17,926	23	16	80.3
Montcalm county.....	33,175	33	28	84.4
Shiawassee county.....	33,512	40	25	74.6
SOUTHWESTERN DIVISION.....	144,961	147	114	78.6
Allegan county.....	39,248	41	32	81.5
Berrien county.....	50,642	45	34	67.1
Cass county.....	19,795	23	19	96.0
Van Buren county.....	35,276	38	29	82.2
SOUTHERN CENTRAL DIVISION.....	332,877	475	319	95.8
Branch county.....	25,520	24	18	70.5
Calhoun county.....	55,668	87	56	100.6
Hillsdale county.....	29,780	32	25	83.9
Jackson county.....	48,314	92	49	101.4
Kalamazoo county.....	55,206	113	65	117.7
Lenawee county.....	49,099	53	42	85.5
St. Joseph county.....	23,534	25	24	102.0
Washtenaw county.....	45,756	49	40	87.4
SOUTHEASTERN DIVISION.....	556,986	898	866	155.5
Macomb county.....	32,894	37	31	94.2
Monroe county.....	32,998	40	35	106.1
Oakland county.....	47,231	72	55	116.4
Wayne county.....	443,863	749	745	167.8

*† These footnotes are below Table 1, on a preceding page.

THE PREVALENCE OF PNEUMONIA IN URBAN AND RURAL LOCALITIES.

Of the 1,678 incorporated localities in Michigan in 1911, 887, or 53 per cent were, at some time during the year, infected with pneumonia. Practically the same number were infected during 1909 and 1910.

To determine what influence, if any, density of population has on the prevalence of pneumonia, the cities and villages have been divided into five groups, as shown in Table 3.

It will be seen that the death rate was very much higher in cities having over 50,000 population and lowest in the cities and villages having from 5,000 to 10,000 population.

By Table 3A, it may be seen that in 1911, the urban localities which showed much higher death rates from pneumonia than the death rate for this disease for the entire State for that year were: Detroit,

Dowagiac, Kalamazoo, Marquette, Monroe, Mt. Clemens, Muskegon, Negaunee, Saginaw, Sault Ste. Marie and Three Rivers.

The localities shown in Table 3A, in which the death rates from pneumonia were much lower in 1911 than the rate for the entire State for that year were: Albion, Battle Creek, Benton Harbor, Boyne City, Cadillac, Calumet Township, Cheboygan, Coldwater, Grand Haven, Hillsdale, Holland, Houghton, Iron Mountain, Ironwood, Jackson, Lansing, Laurium, Ludington, Manistee, Owosso, St. Joseph, Traverse City and Ypsilanti.

The localities shown in Table 3A, which showed much lower death rates from pneumonia in 1911 than the average for such localities in the years 1904-1910 were: Albion, Battle Creek, Calumet Township, Cheboygan, Coldwater, Escanaba, Flint, Grand Haven, Hancock, Hillsdale, Holland, Houghton, Iron Mountain, Ishpeming, Jackson, Laurium, Ludington, Manistee, Pontiac, Wyandotte and Ypsilanti.

The localities shown in Table 3A, which showed much higher death rates in 1911 than the average for such localities in the years 1904-1910, were: Adrian, Ann Arbor, Benton Harbor, Dowagiac, Kalamazoo, Marquette, Mt. Clemens, Negaunee, Niles, Owosso, Saginaw and Three Rivers.

TABLE 3.—*The prevalence of pneumonia in urban and rural localities, in Michigan, in 1911*

Localities—Grouped according to density of population.	Estimated Population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	657,002	3	3	100	996	982	149.5
Cities from 25,000 to 50,000.....	220,746	6	6	100	292	208	94.2
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	16	100	296	239	105.1
Cities and villages from 5,000 to 10,000.....	165,615	23	23	100	180	142	85.8
Cities and villages under 5,000.....	410,698	389	200	51	458	359	87.4
Total urban.....	1,681,399	437	248	57	2,222	1,930	114.8
Rural localities (townships)†.....	1,175,467	1,241	639	51	1,230	957	81.4

*From many localities only the fatal cases were reported, therefore these figures do not represent the number of cases that actually occurred.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 3A.—*The deaths from pneumonia in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 3.*

Localities.	1911.			Average, 1904-1910.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian.....	10,777	13	120.6	11,242	10	89.0
Albion.....	5,981	3	50.2	5,297	6	113.3
Alpena.....	12,757	12	94.1	12,764	12	94.0
Ann Arbor.....	14,853	18	121.2	14,677	13	88.6
Battle Creek.....	25,776	13	50.4	24,605	28	113.8
Bay City.....	45,920	48	104.5	41,231	46	111.6
Benton Harbor.....	9,599	7	72.9	7,132	4	56.1
Boyer City.....	5,679	4	70.4	3,673	3	81.7
Cadillac.....	8,622	6	69.6	7,598	6	79.0
Calumet township.....	20,588	15	72.9	19,542	19	97.2
Cheboygan.....	6,881	3	43.6	6,878	7	101.8
Coldwater.....	5,898	1	17.0	6,190	5	80.8
Detroit.....	490,462	768	156.6	360,655	646	179.1
Dowagiac.....	5,202	7	134.6	4,637	5	107.8
Escanaba.....	13,543	13	96.0	12,227	18	147.2
Flint.....	42,494	36	84.7	19,119	28	146.5
Grand Haven.....	5,959	2	33.6	5,593	5	89.4
Grand Rapids.....	115,380	144	124.8	102,493	107	104.4
Hancock.....	9,472	10	105.6	7,522	12	159.5
Hillsdale.....	5,033	3	59.6	5,189	4	77.1
Holland.....	10,744	4	37.2	9,814	7	71.3
Houghton.....	5,241	1	19.1	4,984	4	80.3
Iron Mountain.....	9,321	4	42.9	8,323	8	96.1
Ironwood.....	13,288	8	60.2	10,588	8	75.6
Ishpeming.....	12,586	11	87.6	10,867	15	138.0
Jackson.....	32,455	24	73.9	26,240	27	102.9
Kalamazoo.....	41,046	67	163.2	34,042	42	123.4
Lansing.....	33,055	20	60.5	23,872	18	75.4
Laurium.....	8,684	4	46.1	8,856	7	79.0
Ludington.....	9,444	7	74.1	7,562	9	119.0
Manistee.....	12,327	8	64.9	11,830	12	101.4
Marquette.....	11,643	20	171.8	11,110	11	99.0
Menominee.....	10,409	13	124.9	10,090	14	138.8
Monroe.....	7,021	10	142.4	6,819	8	117.3
Mt. Clemens.....	7,807	16	204.9	7,479	10	133.7
Muskegon.....	24,590	36	146.4	21,392	29	135.6
Negaunee.....	8,737	12	137.3	6,961	4	57.5
Niles.....	5,242	5	95.4	4,905	3	61.2
Owosso.....	9,721	8	82.3	9,467	6	63.3
Pontiac.....	15,140	18	118.9	12,003	21	175.0
Port Huron.....	18,669	23	123.3	20,328	21	103.3
Saginaw.....	51,160	70	136.8	49,452	50	101.1
St. Joseph.....	6,038	4	66.2	5,499	3	54.6
Sault Ste. Marie.....	12,811	17	132.7	12,094	14	115.8
Three Rivers.....	5,265	14	265.9	4,273	5	117.0
Traverse City.....	12,213	10	81.9	12,343	10	81.0
Wyandotte.....	8,764	8	91.3	5,964	11	184.4
Ypsilanti.....	6,004	3	50.0	7,505	5	66.6

*Estimated for intercensal years.

SEASONAL PREVALENCE.

Judging from the average number of persons who were taken sick in each month in the eight years, 1904-1911, shown in Table 4, pneumonia was most prevalent in the month of February, and least prevalent in the month of August.

By the secretary of State's vital statistics of Michigan, it appears that during the fourteen years, 1898-1911, the greatest number of deaths

occurred in the months of February and March and the least number in August.

TABLE 4.—*The seasonal prevalence of pneumonia, in Michigan, as indicated by the average number of persons taken sick in each month in the eight years, 1904-1911, and by the average number of deaths from this disease, in each month in the fourteen years, 1898-1911.*

Years.		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904-1911	Average number of persons taken sick in each month*.	437	458	409	334	262	109	65	55	88	138	213	279
1898-1911	Average number of deaths in each month†.....	374	421	420	346	259	131	77	67	84	130	115	276

*The months in which some of the cases were taken sick were not reported.

†The averages for the years, 1898-1903, are compiled from the Secretary of State's vital statistics of Michigan, and for the years, 1904-1911, from the "Michigan Monthly Bulletin of Vital Statistics."

INFLUENCE OF AGE AND SEX.

The ages of those taken sick with pneumonia in the eight years, 1904-1911, were stated in 27,119 instances.

In the case of those who died with pneumonia, the ages were stated in 22,092 instances, and of this number, about 24 per cent were under one year; 37 per cent under five years; 9 per cent between the ages of 5 and 25 years; 16 per cent between the ages of 25 and 50 years; nearly 26 per cent between the ages of 50 and 75 years and over.

The number and per cent of cases and deaths by one-year periods from 0 to 5 years, by five-year periods from 5 to 75 years, and in one group for those over 75 years, are contained in Table 5.

Thirty-seven per cent of the males and 37 per cent of the females who died, and 18 per cent of the males and 20 per cent of the females who recovered were under five years of age.

Ten per cent of the males and 14 per cent of the females who died, and two per cent of the males and four per cent of the females who recovered, were over 74 years of age.

At every age group, with the exception of 4-5 and over 74 years, the fatality was slightly higher among the males than in the females; at all ages up to 55 years, the recoveries were more numerous among the males. After the 55th year, the recoveries were more numerous among the females.

PREDISPOSING INFLUENCES.

In reply to the question, "What sickness or other predisposing influence preceded this case?" 3,412 cases were reported as having followed a cold; 1,244 cases following influenza; 628 cases following bronchitis; 452 cases following exposure to inclement weather.

A complete list of the predisposing influences to pneumonia may be found in Table 6.

TABLE 5.—*The influence of age and sex in pneumonia, as indicated by the number of those of known ages, who died or recovered from this disease, in the eight years, 1907-1914. Arranged by sex, in age periods of one year for those of from one to five years; in five year periods for those of from five to seventy-five years; and in one group for those of seventy-five years and over.*

Age periods.	Died.			Per cent of deaths.			Total recoveries.			Recovered.		
	Total deaths.			Per cent of deaths.			Total recoveries.			Per cent of recoveries.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
0-1 year.....	3,041	2,229	5,270	13.76	10.09	23.85	114	84	198	2.27	1.67	3.94
1-2 years.....	917	821	1,738	4.15	3.72	7.87	100	99	199	1.99	1.97	3.96
2-3 years.....	317	294	611	1.44	1.33	2.77	110	94	204	2.19	1.86	4.05
3-4 years.....	183	174	357	.83	.79	1.62	102	85	187	2.03	1.69	3.72
4-5 years.....	110	116	226	.50	.53	1.03	93	64	157	1.85	1.27	3.12
Under five years.....	4,568	3,634	8,202	20.67	16.45	37.12	519	426	945	10.32	8.47	18.79
5-9 years.....	287	271	558	1.30	1.22	2.52	406	313	719	8.08	6.23	14.31
10-14 years.....	141	171	312	.64	.77	1.41	251	183	434	5.00	3.64	8.64
15-19 years.....	303	215	518	1.37	.97	2.34	326	148	474	6.48	2.94	9.42
20-24 years.....	359	260	619	1.62	1.18	2.80	226	100	326	4.50	1.99	6.49
25-29 years.....	340	256	596	1.54	1.16	2.70	163	93	256	3.24	1.85	5.09
30-34 years.....	374	277	651	1.69	1.26	2.95	134	100	234	2.67	1.99	4.66
35-39 years.....	439	296	735	1.33	2.00	3.33	137	97	234	2.73	1.93	4.66
40-44 years.....	492	261	753	2.22	1.18	3.40	130	91	221	2.59	1.81	4.40
45-49 years.....	557	301	858	2.52	1.36	3.88	130	113	243	2.59	2.25	4.84
50-54 years.....	532	322	854	2.41	1.46	3.87	122	81	206	2.42	1.68	4.10
55-59 years.....	569	403	972	2.58	1.82	4.40	75	81	156	1.49	1.61	3.10
60-64 years.....	625	533	1,158	2.82	2.42	5.21	83	85	168	1.65	1.69	3.34
65-69 years.....	684	615	1,299	3.10	2.78	5.88	63	83	146	1.25	1.65	2.90
70-74 years.....	686	681	1,367	3.11	3.08	6.19	62	70	132	1.23	1.39	2.62
75 years and over.....	1,243	1,397	2,640	5.63	6.32	11.95	53	80	133	1.05	1.59	2.64
All ages.....	12,199	9,893	22,092	54.56	45.44	100.00	2,580	2,147	5,027	57.30	42.70	100.00

TABLE 6.—*Predisposing influences in pneumonia, as indicated by the manner in which the disease was reported to have begun, in some of the cases, in the eight years, 1904-1911.*

Disease began as or followed.	Number of instances.	Disease began as or followed.	Number of instances.
Cold.....	3,412	Mitral insufficiency.....	13
Influenza.....	1,244	Erysipelas.....	13
Bronchitis.....	628	Sepsis.....	11
Exposure to inclement weather.....	452	Diphtheria.....	10
Heart disease.....	358	Cholera infantum.....	9
Senility.....	358	Cancer.....	9
Measles.....	331	Dropsy.....	9
Whooping-cough.....	217	Spinal trouble.....	8
Kidney trouble.....	153	Rickets.....	8
Asthma.....	144	Chicken-pox.....	8
Pleurisy.....	118	Epilepsy.....	7
Alcoholism.....	115	Malarial fever.....	7
Bowel trouble.....	92	Scarlet fever.....	6
Confinement.....	90	Teething.....	6
General debility.....	88	Otitis media.....	6
Meningitis.....	72	Eclampsia.....	6
Stomach trouble.....	71	Insanitary conditions.....	5
Rheumatism.....	65	Syphilis.....	5
Tuberculosis.....	63	Mumps.....	5
Traumatism.....	59	Non-acclimated.....	4
Paralysis.....	45	Uremia.....	4
Convulsions.....	37	Dust on lungs.....	4
Liver trouble.....	34	Morphine habit.....	4
Tonsillitis.....	32	Hiccough.....	3
Mal-nutrition.....	30	Eczema.....	3
Typhoid fever.....	29	Puerperal fever.....	3
Abscess.....	27	Gangrene.....	3
Apoplexy.....	24	Catarrhal fever.....	2
Marasmus.....	23	Eye trouble.....	2
Croup.....	20	Strangulation of hernia.....	2
Lung trouble.....	20	Pyemia.....	2
Mis-carriage.....	18	Adenoids.....	1
Diabetes.....	18	Anesthesia.....	1
Operation.....	18	Change of life.....	1
Peritonitis.....	17	Thrush.....	1
Brain trouble.....	16	Carbuncle.....	1
Anaemia.....	15	Sunstroke.....	1
Appendicitis.....	15	Palsy.....	1
Throat trouble.....	14		

INFLUENCE OF OCCUPATION.

Heading the list of occupations of pneumonia patients are those employed in housework—housewives, housekeepers and domestics—to the number of 4,335, many of whom spend a considerable portion of their time in ill-ventilated and dust-laden rooms.

Next in order is the farmer class, to the number of 2,703, who, though naturally a hardy race, seem to be very susceptible to this disease.

Next in order is the laboring class, with 1,589 cases; and next to them the student class—principally young children of school age—with 698 cases.

A complete list of the occupations of pneumonia patients, as reported in the eight years, 1904-1911, may be found in Table 7.

TABLE 7.—*The influence of occupation in pneumonia, in the eight years, 1904-1911.*

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housewife.....	4,335	Cigarmaker.....	25	Stone cutter.....	5
Farmer.....	2,703	Nurse.....	24	Nun.....	4
Laborer.....	1,589	Tailor.....	24	Attendant in prison or asylum.....	4
Student.....	698	Legal profession.....	24	Chauffeur.....	4
Mechanic.....	543	Night watchman.....	21	Inspector.....	3
Miner.....	333	Printer.....	17	Theatrical man.....	3
Clerk.....	311	Baker.....	17	Cattle buyer.....	3
Merchant.....	288	Lineman.....	17	Cooper.....	3
Teamster.....	137	Harnessmaker.....	16	Motorman.....	2
Railroad man.....	121	Liveryman.....	16	Surface foreman.....	2
Factory employe.....	105	Engineer.....	16	Messenger.....	2
Painter and paper hanger.....	86	Musician.....	15	Hairdresser.....	2
Agent.....	78	Mail carrier.....	15	Carpet weaver.....	2
Woodsman.....	72	Fireman.....	15	Elevator boy.....	2
School Teacher.....	64	Hotel keeper.....	14	Butter maker.....	1
Saloon man.....	58	Waiter.....	14	Bean picker.....	1
Machinist.....	52	Fisherman.....	13	Well digger.....	1
Physician.....	50	Plumber.....	13	Architect.....	1
Dressmaker and milliner.....	44	Policeman.....	13	Plasterer.....	1
Sailor.....	42	Tinner.....	11	Upholsterer.....	1
Minister.....	41	Peddler.....	10	Trapper.....	1
Lumberman.....	40	Washerwoman.....	9	Ice cream maker.....	1
Shoemaker.....	37	Real estate man.....	8	Racehorse man.....	1
Mason.....	36	Porter.....	7	Chemist.....	1
Contractor.....	33	Dentist.....	7	Salt packer.....	1
Cook.....	32	Veterinarian.....	7	Photographer.....	1
Barber.....	31	Cooper.....	6	Feather renovator.....	1
Janitor.....	28	Laundryman.....	6	Collector.....	1
Gardener and florist.....	28	Marine engineer.....	5	Bath attendant.....	1
Miller.....	28	Soldier.....	5		
Butcher.....	27				

RESTRICTIVE AND PREVENTIVE MEASURES.

By reference to Table 8, it may be seen that, of the total number of cases of pneumonia in the eight years, 1904-1911, but 10,307, or 37 per cent, were isolated from all persons except nurses and attending physicians; that in 12,434 instances, or 46 per cent of the whole number, the sputa was disinfected, and that in 15,659 instances, or 56 per cent of the whole number, the rooms occupied by the patient were disinfected. The enforcement of the restrictive and preventive measures in 1911 shows a slight improvement over that of former years.

As previously stated, in a large number of instances, this Department received the first information of cases of pneumonia through the death returns, and, in many instances, the health officials had no knowledge of these cases until notified of the same by this Department, when, of course, it would be too late to carry out the restrictive and preventive measures. This fact will account, to a considerable extent, for the comparatively small number of cases in which precautions were taken.

TABLE 8.—*Restrictive and preventive measures in pneumonia, in Michigan, in the eight years, 1904-1911.*

Restrictive and preventive measures.	Number of instances.	Per cent.
ISOLATION:		
Enforced.....	10,307	37
Neglected.....	5,402	19
Not stated or statements doubtful.....	12,113	44
DISINFECTION OF SPUTA:		
Enforced.....	12,434	*46
Neglected.....	2,259	*8
Not stated or statements doubtful.....	12,488	*46
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:		
Enforced.....	15,744	*58
Neglected.....	2,163	*8
Not stated or statements doubtful.....	9,274	*34
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS.		
Enforced.....	15,659	56
Neglected.....	3,288	12
Not stated or statements doubtful.....	8,875	32

*In 641 instances the reports stated that there was no sputa, therefore this number has been deducted from the total number of cases before making the per cent.

TUBERCULOSIS IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year, 1911, tuberculosis was reported present in 945 health jurisdictions in this State, with an aggregate of 5,254 cases, including 2,710 deaths. By Table 9, it may be seen that the number of cases reported in 1911 was somewhat greater than in any of the preceding years. This fact is undoubtedly due to the new law, which became operative in June, 1909, requiring all physicians to report all cases of tuberculosis which came under their observation, the State paying the physicians fifty cents for each case reported.

By reason of the fact that many cases of this disease are of long duration, and in some stages of the disease not under the care of a physician, the number of cases reported to this Department is believed to be considerably less than the actual number in existence. The above reason is also given for the high rate of deaths to cases.

The compilation of information relative to the prevalence of tuberculosis in Michigan was made for the first time in 1893, but from that

TABLE 9.—*The prevalence of tuberculosis, in Michigan, in each of the fourteen years, 1898-1911.*

Years.	Population.*	Number of cases.†	Number of Deaths.	Deaths per 100,000 of the population
1898.....	2,361,201	3,041	2,728	115.5
1899.....	2,391,091	2,975	2,516	105.2
1900.....	2,420,982	2,721	2,221	91.7
1901.....	2,450,872	2,915	2,344	95.6
1902.....	2,475,499	2,658	2,185	88.3
1903.....	2,502,758	2,745	2,319	92.7
1904.....	2,530,016	2,928	2,515	99.4
1905.....	2,557,275	2,590	2,464	96.4
1906.....	2,584,533	2,653	2,502	96.8
1907.....	2,611,792	2,699	2,496	95.6
1908.....	2,639,050	2,705	2,512	95.2
1909.....	2,666,309	3,423	2,465	92.4
1910.....	2,810,173	4,415	2,667	95.3
1911.....	2,856,866	5,254	2,710	94.9
Average per year.....	2,561,316	3,123	2,475	96.6

*Estimated for intercensal years.

†From many localities only the fatal cases were reported, therefore the figures in this column do not represent the number of cases that actually occurred.

time to 1898, when the new law for registration of deaths took effect, the reports of cases and deaths were much less than the actual number occurring; hence the reason for commencing Table 9 with the year 1898.

The number of deaths from pulmonary tuberculosis per 100,000 persons living, reported to the Secretary of State during the twenty-nine years ending with 1897 (Table 10), probably quite accurately represents the annual fluctuation of, but not the total deaths from, this disease. It may be seen that, compared with any previous year, there was a remarkable and unprecedented decrease in the death rate from tuberculosis in 1891. This decrease is probably due to the "campaign of education" as to the restriction and prevention of this disease, which began in 1880, and which, apparently, began to show results in 1891.

TABLE 10.—*The number of reported deaths from tuberculosis of the lungs per 100,000 persons living, in Michigan, in each of the twenty-nine years 1869-1897. Compiled from the Secretary of State's vital statistics of Michigan.*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths.....	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7
Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths.....	116.1	104.4	112.3	120.8	105.3	107.3	108.7	121.0	104.3	105.4	96.3	95.2
Year.	1893.	1894.	1895.	1896.	1897.	Average, 1869-1897.						
Deaths.....	97.7	98.4	105.1	90.4	80.6	106.2						

GEOGRAPHICAL DISTRIBUTION.

By Table 11, it may be seen that, as compared with the average death rate for tuberculosis for the entire State (96.6 deaths per 100,000 inhabitants), the disease was much more prevalent than usual in the counties of Luce, Mackinac, Grand Traverse and Wayne.

In a lesser degree, the disease was more prevalent than usual in the counties of Houghton, Marquette, Leelanau, Kent and Roscommon.

The disease was much less prevalent than usual in the counties of Alger, Iron, Schoolcraft, Wexford, Crawford, Otsego, Ogemaw, Oscoda, Presque Isle, Clare, Gladwin, Missaukee, Osceola, Arenac and Barry.

TABLE 11.—*The geographical distribution of tuberculosis, in Michigan, in the fourteen years, 1898-1911, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.....	279,235	375	282	101.0
Alger county.....	6,578	5	3	45.8
Baraga county.....	5,400	5	5	92.6
Chippewa county.....	22,118	25	21	94.9
Delta county.....	27,313	37	30	109.8
Dickinson county.....	18,790	23	17	90.5
Gogebic county.....	17,969	19	17	94.6
Houghton county.....	71,442	122	82	114.8
Iron county.....	9,762	10	7	71.7
Keweenaw county.....	4,784	7	5	104.5
Luce county.....	3,745	6	5	133.5
Mackinac county.....	8,211	12	11	134.0
Marquette county.....	40,966	64	46	112.3
Menominee county.....	26,091	22	21	80.5
Ontonagon county.....	7,365	10	6	81.4
Schoolcraft county.....	8,698	8	6	69.0
NORTHWESTERN DIVISION.....	91,749	133	99	107.9
Benzie county.....	10,930	14	12	109.8
Grand Traverse county.....	23,391	53	33	141.1
Leelanau county.....	10,865	14	13	119.7
Manistee county.....	27,188	34	27	99.3
Wexford county.....	19,375	18	14	72.3
NORTHERN DIVISION.....	84,846	84	71	83.7
Antrim county.....	15,442	14	13	84.2
Charlevoix county.....	16,402	19	15	91.5
Cheboygan county.....	17,335	16	14	80.8
Crawford county.....	3,740	3	2	53.5
Emmet county.....	17,443	21	17	97.5
Kalkaska county.....	7,522	7	6	79.8
Otsego county.....	6,962	4	4	57.5
NORTHEASTERN DIVISION.....	60,674	48	43	70.9
Alcona county.....	5,650	5	5	88.5
Alpena county.....	19,968	17	16	80.1
Iosco county.....	10,238	9	8	78.1
Montmorency county.....	3,576	3	3	83.9
Ogemaw county.....	8,720	6	5	57.3
Oscoda county.....	1,920	2	1	52.1
Presque Isle county.....	10,602	6	5	47.2
WESTERN DIVISION.....	284,148	383	284	99.9
Kent county.....	142,035	226	155	109.1
Lake county.....	5,024	6	5	99.5
Mason county.....	20,175	23	19	94.2
Muskegon county.....	37,460	48	38	101.4
Newaygo county.....	18,495	15	14	75.7
Oceana county.....	17,900	16	15	83.8
Ottawa county.....	43,059	49	38	88.3
NORTHERN CENTRAL DIVISION.....	107,217	96	81	75.5
Clare county.....	9,165	7	6	65.5
Gladwin county.....	8,336	6	5	60.0
Isabella county.....	24,103	25	20	83.0
Mecosta county.....	20,296	19	17	83.8
Midland county.....	14,765	13	12	81.3
Missaukee county.....	10,238	7	6	58.6
Oscoda county.....	18,575	17	13	70.0
Roscommon county.....	1,739	2	2	115.0

*†These footnotes are below Table 9, on a preceding page.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.....	348,622	324	284	81.5
Arenac county.....	9,872	7	6	60.8
Bay county.....	64,765	64	58	89.6
Huron county.....	35,198	31	27	76.7
Lapeer county.....	27,047	27	20	73.9
Saginaw county.....	86,014	81	73	84.9
Sanilac county.....	34,791	32	28	80.5
St. Clair county.....	55,045	49	43	78.1
Tuscola county.....	35,890	33	29	80.8
CENTRAL DIVISION.....	320,381	364	274	85.5
Barry county.....	22,301	20	15	67.7
Clinton county.....	25,004	23	19	76.0
Eaton county.....	30,946	36	30	96.9
Genesee county.....	46,078	50	41	89.0
Gratiot county.....	30,094	32	27	89.7
Ingham county.....	45,212	46	33	73.0
Ionia county.....	34,839	43	33	94.7
Livingston county.....	18,605	45	17	91.4
Montcalm county.....	33,494	32	28	83.7
Shiawassee county.....	33,808	37	31	91.7
SOUTHWESTERN DIVISION.....	144,006	172	132	91.7
Allegan county.....	39,166	43	34	86.8
Berrien county.....	50,228	70	50	99.5
Cass county.....	20,246	23	19	93.8
Van Buren county.....	34,366	36	29	84.4
SOUTHERN CENTRAL DIVISION.....	327,714	429	305	93.1
Branch county.....	26,027	30	22	84.5
Calhoun county.....	53,711	57	48	89.4
Hillsdale county.....	29,809	31	26	87.2
Jackson county.....	48,157	51	43	89.3
Kalamazoo county.....	51,246	99	55	107.3
Lenawee county.....	48,910	49	41	83.8
St. Joseph county.....	23,743	28	22	92.7
Washtenaw county.....	46,111	84	48	104.1
SOUTHEASTERN DIVISION.....	517,149	714	617	119.3
Macomb county.....	32,998	40	35	106.1
Monroe county.....	33,108	36	32	96.7
Oakland county.....	46,216	60	45	97.4
Wayne county.....	404,827	578	505	124.7

THE PREVALENCE OF TUBERCULOSIS IN URBAN AND RURAL LOCALITIES.

By reference to Table 12, it may be seen that, in 1911, as indicated by the death rates, tuberculosis was most prevalent in the large centers of population, particularly in the cities of from 10,000 to 25,000 inhabitants, and cities of 50,000 and over. In cities of from 25,000 to 50,000, the cities and villages from 5,000 to 10,000, the cities and villages under 5,000 and in the rural localities, the death rates were less than the death rate for the entire State for that year.

By Table 12A, it is shown that, in 1911, the urban localities that showed much higher death rates from tuberculosis than the death rate for this disease for the entire State for that year were: Alpena, Ann Arbor (due undoubtedly to hospital cases), Benton Harbor, Hancock, Kalamazoo (due to deaths in hospital for insane), Sault Ste. Marie, Traverse City (due to deaths in hospital for insane), Wyandotte and

Ypsilanti. The footnote under Table 12A, shows the death rates for the asylum cities.

The localities, shown in Table 12A, in which the death rates from tuberculosis were much lower in 1911 than the rate for the entire State for that year, were: Albion, Cadillac, Cheboygan, Coldwater, Hillsdale, Houghton, Ishpeming, Lansing, Ludington, Negaunee, St. Joseph and Three Rivers.

The localities, shown in Table 12A, which showed much higher death rates from tuberculosis in 1911 than the average for such localities in the years, 1904-1910, were: Alpena, Laurium, Monroe, Muskegon, Port Huron and Ypsilanti.

The localities, shown in Table 12A, which showed much lower death rates from tuberculosis in 1911 than the average for such localities for the years, 1904-1910, were: Albion, Cheboygan, Escanaba, Flint, Hillsdale, Houghton, Ishpeming, Negaunee, Owosso and St. Joseph.

TABLE 12.—*The prevalence of tuberculosis in urban and rural localities, in Michigan, in 1911.*

Localities—Grouped according to density of population.	Estimated Population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	657,002	3	3	100	1,549	748	113.9
Cities from 25,000 to 50,000.....	220,746	6	6	100	434	202	91.5
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	16	100	681	275	121.0
Cities and villages from 5,000 to 10,000.....	165,615	23	23	100	412	155	93.6
Cities and villages under 5,000.....	410,698	389	235	60	629	357	86.9
Total urban.....	1,681,399	437	283	65	3,705	1,737	103.3
Rural localities (townships)†.....	1,175,467	1,241	662	53	1,549	923	78.5

*From many localities only the fatal cases are reported, therefore these figures do not represent the number of cases that actually occurred.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 12A.—*The deaths from tuberculosis in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 12.*

Localities.	1911.			Average, 1904-1910.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian.....	10,777	9	83.5	11,242	9	80.0
Albion.....	5,981	3	50.2	5,297	4	75.5
Alpena.....	12,757	19	148.9	12,764	11	86.2
Ann Arbor.....	14,853	25	168.3	14,677	20	136.3
Battle Creek.....	25,776	23	89.2	24,605	25	101.6
Bay City.....	45,920	41	89.3	41,231	35	84.9
Benton Harbor.....	9,599	12	125.0	7,132	11	154.2
Boyer City.....	5,679	5	88.0	3,673	3	81.7
Cadillac.....	8,622	6	69.6	7,598	6	79.0
Calumet township.....	20,588	20	97.1	19,542	25	127.9
Cheboygan.....	6,881	3	43.6	6,878	6	87.2
Coldwater.....	5,898	4	67.8	6,190	5	80.8
Detroit.....	490,462	565	115.2	360,655	436	120.9
Dowagiac.....	5,202	5	96.1	4,637	5	107.8
Escanaba.....	13,543	12	88.6	12,227	19	155.4
Flint.....	42,494	31	73.0	19,119	20	104.6
Grand Haven.....	5,959	5	83.9	5,593	6	107.2
Grand Rapids.....	115,380	129	111.8	102,493	109	106.3
Hancock.....	9,472	13	137.2	7,522	11	146.2
Hillsdale.....	5,033	2	39.7	5,158	68	115.6
Holland.....	10,744	9	83.8	9,814	10	101.9
Houghton.....	5,241	3	57.2	4,984	4	80.3
Iron Mountain.....	9,321	10	107.3	8,323	9	108.1
Ironwood.....	13,288	10	75.3	10,588	10	94.4
Ishpeming.....	12,586	7	55.6	10,867	15	138.0
Jackson.....	32,455	31	95.5	26,240	30	114.3
Kalamazoo.....	41,046	53	129.1	34,042	46	135.1
Lansing.....	33,053	23	69.6	23,872	16	67.0
Laurium.....	8,684	10	115.2	8,856	8	90.3
Ludington.....	9,444	5	52.9	7,562	5	66.1
Manistee.....	12,327	18	146.0	11,830	15	126.8
Marquette.....	11,643	17	146.0	11,110	16	144.0
Menominee.....	10,409	8	76.9	10,090	10	99.0
Monroe.....	7,021	10	142.4	6,819	7	102.7
Mt. Clemens.....	7,807	11	140.9	7,479	10	133.7
Muskegon.....	24,590	32	130.1	21,392	25	116.9
Negaunee.....	8,737	4	46.0	6,961	7	100.6
Niles.....	5,242	6	114.5	4,905	7	142.7
Owosso.....	9,721	7	72.0	9,476	10	105.5
Pontiac.....	15,140	20	132.1	12,003	20	166.6
Port Huron.....	18,669	22	117.8	20,328	14	68.9
Saginaw.....	51,160	54	105.6	49,452	49	99.1
St. Joseph.....	6,038	4	66.2	5,499	5	90.9
Sault Ste. Marie.....	12,811	18	140.5	12,094	15	124.0
Three Rivers.....	5,265	3	57.0	4,273	3	70.2
Traverse City.....	12,213	29	237.5	12,343	30	243.1
Wyandotte.....	8,764	14	159.8	5,964	11	184.4
Ypsilanti.....	6,004	10	166.6	7,505	8	106.6

*Estimated for intercensal years.

†The death rate for Ann Arbor is much increased by the deaths occurring in the U. of M. hospital.

‡Excluding the deaths from tuberculosis occurring in the asylum, the death rate from this disease for the city is 86.9, while the death rate in the asylum is 979.9 per 100,000 inmates.

§The death rate for the city is 65.9 and for the asylum 738.3.

|| The death rate for the city is 97.8 and for the asylum 1,323.5.

THE SEASONAL PREVALENCE OF TUBERCULOSIS.

As a rule, tuberculosis in the early stages, is not recognized, and consequently, the time of its inception is not generally known or reported. This, coupled with the fact that regular reports of the progress of many cases are lacking, renders it difficult to determine with any degree of accuracy, the seasonal prevalence of this disease. Table 13 is; therefore, designed to take the place of a table showing the seasonal prevalence. The months of greatest fatality, named in the order of the greatest number of deaths, were April, May and March; the months of least fatality being from July to September, inclusive.

TABLE 13.—*The seasonal fatality from tuberculosis, in Michigan, as shown by the average number of deaths from this disease in each month in the eighteen years, 1894-1911.*

Months.....	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths.....	174	176	194	197	194	165	156	154	148	163	159	170

LOCATION OF THE DISEASE IN TUBERCULOSIS.

The location of the disease in tuberculous persons for the period of seventeen years, ending in 1911, is shown in Table 14. With a view to aiding this study, the body has been divided into five divisions, as follows: Cranial cavity, spine, thoracic cavity, abdominal cavity and joints. As may be seen by the above mentioned table, the disease was located in the thoracic cavity in nearly seven times as many instances as in all the other divisions combined, and of the organs of the thoracic cavity, the disease was located in the lungs in thirty-three times as many instances as in all the other organs of that cavity combined.

Usually the disease was located in more than one part of the body, and in many instances, several different organs or parts, at the same time.

TABLE 14.—*Location of the disease in tuberculous persons, in Michigan, during the seventeen years, 1895-1911.*

Part of body.		Number of instances.
Cranial cavity (meninges and membranes).....		284
Spine (vertebrae, cord and membranes).....		136
Thoracic cavity.....	Pharynx.....	13
	Larynx.....	356
	Bronchi.....	114
	Lungs.....	26,647
	Pleura.....	29
	Instances in which the location of the disease was not specified.....	262
Abdominal cavity...	Stomach.....	226
	Liver.....	96
	Kidneys.....	145
	Spleen.....	9
	Bladder.....	48
	Intestines.....	1,474
	Peritoneum.....	391
	Instances in which the location of the disease was not specified.....	151
Joints.....	Shoulder.....	3
	Elbow.....	3
	Hip.....	118
	Knee.....	46
	Joints not specified.....	20
Instances in which the disease was located in the tissues or other parts of the body but not definitely specified.....		1,036

REPORTED SOURCES OF CONTAGIUM.

The difficulty in tracing cases of tuberculosis to their sources is nowhere better illustrated than in the very small number of reports received at this office from year to year which throw any light upon this phase of the study of tuberculosis, and it is probable that, in many instances, where a source is reported, the information is based upon circumstantial evidence only. From the reports of tuberculosis for the years 1907-1911, it is learned that 606 cases were traced to former cases of the disease, and that in 1,575 instances the patients had tuberculous relatives and associates.

In reply to the question, "Can you trace any other case of consumption or tuberculosis to this case?" the health officer answered "Yes" in 65 instances during the years 1907-1911.

INFLUENCE OF AGE AND SEX IN TUBERCULOSIS.

Table 15 indicates that the greatest number of those of both sexes who died from tuberculosis, were between the ages of twenty and thirty years. From infancy up to the age of thirty, there was a gradual increase, and after the age of thirty there was a gradual decrease in the number of those who died from this disease. Of those who died under the age of forty, the greater number were females; while of those who died between the ages of forty to eighty, the greater number were males. At all ages the females constituted about 53 per cent of those who died.

The average age of fatal cases in the eighteen years, 1894-1911, was for males 36.2 years, and for females 32.7.

TABLE 15.—*The influence of age and sex in tuberculosis, as indicated by the number of those of known ages who died from this disease, in Michigan, in the eighteen years, 1894-1911. Arranged by sex in age periods of ten years each.*

Age periods.	Number.			Per cent.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10 years.....	706	738	1,444	1.97	2.06	4.03
10 to 19 years.....	1,494	2,773	4,267	4.16	7.73	11.89
20 to 29 years.....	4,890	6,275	11,165	13.63	17.49	31.12
30 to 39 years.....	3,495	4,012	7,507	9.74	11.19	20.93
40 to 49 years.....	2,527	2,141	4,668	7.04	5.97	13.01
50 to 59 years.....	1,873	1,310	3,183	5.22	3.65	8.87
60 to 69 years.....	1,261	1,084	2,345	3.52	3.02	6.54
70 to 79 years.....	607	511	1,118	1.69	1.43	3.12
80 years and over.....	82	95	177	.23	.26	.49
All ages.....	16,935	18,939	35,874	47.20	52.80	100.00

INFLUENCE OF COLOR IN TUBERCULOSIS.

In Table 16 it is shown that, according to the white and colored persons in the population, tuberculosis was more prevalent among the colored population.

Of all the nationalities, excepting the white race, the disease was most prevalent among the Indians.

TABLE 16.—*The color of some of the tuberculous persons, in Michigan, reported during the seventeen years, 1895-1911.*

Color.	Number of instances in which the color was stated.	Per cent.	Approximate proportion of the total population of the State.—Expressed in per cents.
White.....	37,481	96.67	99.08
Black (Negro).....	749	1.93	.64
Red (Indian).....	540	1.39	.26
Yellow (Japanese).....	2	.01	.26

CIVIL CONDITIONS OF TUBERCULOUS PERSONS.

During the years 1895-1911, the reports of cases in which the civil conditions of patients was stated, showed that 58 per cent of the patients were or had been married, and that 42 per cent were single.

INFLUENCE OF OCCUPATION IN TUBERCULOSIS.

What has been said in the preceding article, relative to the influence of occupation in pneumonia, will apply equally to tuberculosis, as a comparison of tables 7 and 17 will show.

During the seventeen years in which the occupation of tuberculous persons has been studied, very many cases were reported as having no occupations, as infants, inmates of charitable, penal and reformatory institutions, etc.

To learn what occupations render persons more susceptible to tuberculosis than others, this Department has made a special study of certain occupations, showing the proportionate mortality from tuberculosis in the three years, 1908-1910 compared with the average mortality from tuberculosis of all persons in Michigan, in the five years, 1903-1907, by age groups, as may be seen by Tables 17A, 17B, etc. (At the time of writing this report the information relative to occupations was not available for 1911.)

By reference to Table 17A, it is shown that the average annual per cent of deaths due to tuberculosis, among all persons over 15 years of age, in the five years, 1903-1907, is 9.4; by reference to Table 17C, it will be seen that the average annual per cent of deaths due to tuberculosis among males over 15 years of age, for the same five-year period, is 8.4; and Table 21D shows that the average annual per cent of deaths due to tuberculosis among females over 15 years of age, for the same five-year period, is 10.6.

Table 17A shows that, in the three years, 1908-1910, tuberculosis caused 28.2 per cent of all the deaths among persons engaged in cigar making, while among all persons of the same ages tuberculosis caused 9.4 per cent of the deaths.

Table 17B shows that 27.6 per cent of the deaths among school teachers was due to tuberculosis, as compared with 9.4 per cent among all persons.

Table 17C shows that 26.4 per cent of the deaths among printers was due to tuberculosis, as compared with 8.4 per cent among all males.

Table 17D shows that 18.1 per cent of the deaths among dressmakers was due to tuberculosis, compared with 10.6 per cent among all females.

Table 17E shows that 17.7 per cent of the deaths among painters was due to tuberculosis, compared with 8.4 per cent among all males.

Table 17F shows that 13.2 per cent of the deaths among teamsters was due to tuberculosis, compared with 8.4 per cent among all males.

Table 17G shows that 12.1 per cent of the deaths among the miners was due to tuberculosis, compared with 8.4 per cent among all males.

Table 17H shows that 12.1 per cent of the deaths among tailors was due to tuberculosis, compared with 9.4 among all persons.

Table 17I shows that only 7.3 per cent of the deaths among carpenters was due to tuberculosis, compared with 8.4 per cent among all males.

TABLE 17.—*Occupations of tuberculous persons, in Michigan, in the seventeen years, 1895-1911.*

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housework.....	10,838	Fireman.....	32	Ragpicker and sorter.....	3
Farmer.....	3,551	Soldier.....	31	Watchman.....	3
Laborer.....	3,277	Photographer.....	31	Coremaker.....	3
Student.....	1,443	Metal polisher.....	27	Bootblack.....	3
Clerk (office or store).....	1,439	Fisherman.....	26	Lithographer.....	3
Mechanic.....	898	Lumberman.....	26	Optician.....	3
Merchant.....	615	Porter.....	26	Cooper.....	3
Machinist.....	447	McTormon and conductor.....	25	Silkworker.....	3
Miner.....	373	Janitor.....	23	Baseball player.....	3
Factory employe.....	371	Butcher.....	23	Plasterer.....	2
Teacher.....	334	Miller.....	20	Chauffeur.....	2
Dressmaker and milliner.....	334	Jeweler.....	17	Stereotyper.....	2
Teamster.....	307	Peddler.....	17	Chiropodist.....	2
Painter and paper hanger.....	266	Contractor and builder.....	14	Diver.....	2
Saloonman.....	200	Theatrical person.....	14	Scientist.....	2
Railroad employe.....	191	Dentist.....	14	Broommaker.....	2
Salesman and agent.....	177	Tinner.....	14	Chemist.....	2
Barber.....	148	Civil engineer.....	13	Weaver.....	2
Cigar maker.....	141	Undertaker.....	11	Billposter.....	2
Printer.....	138	Mason.....	10	Furniture packer.....	2
Engineer.....	99	Patrolman.....	10	Cheesemaker.....	2
Tailor.....	99	Mail carrier.....	10	Steward.....	2
Cook.....	92	Hunter and trapper.....	9	Furrier.....	1
Sailor.....	91	Glassworker.....	8	Elevator man.....	1
Woodsmen.....	90	Harnessmaker.....	8	Bookbinder.....	1
Musician.....	81	Upholsterer.....	8	Balloonist.....	1
Moulder.....	79	Tanner.....	7	Attendant in prison or asylum.....	1
Nurse.....	75	Veterinary Surgeon.....	7	Dancing master.....	1
Shoemaker.....	64	Liveryman.....	7	Prostitute.....	1
Waiter.....	64	Hairdresser.....	7	Feather renovator.....	1
Physician and Surgeon.....	61	Stockbuyer.....	6	Chimney sweep.....	1
Baker.....	61	Candy maker.....	6	Milkman.....	1
Artist.....	59	Boorman.....	5	Sewer inspector.....	1
Electrician.....	52	Athlete.....	5	Engraver.....	1
Laundry work.....	47	Millwright.....	5	Messenger.....	1
Minister.....	46	Ice man.....	4	Sawfiler.....	1
Plumber.....	46	Electrotypist.....	3	Jockey.....	1
Gardener and florist.....	43	Brassworker.....	3	Shears grinder.....	1
Lawyer.....	36	Carriage trimmer.....	3		
Stone or marble cutter.....	35	Buttermaker.....	3		

TABLE 17A.—*The proportionate mortality from tuberculosis among cigarmakers and tobacco workers during the years, 1908-1910, compared with that of all persons, in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of cigarmakers in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Cigarmakers, 1908-1910.	All persons in Michigan, 1903-1907.
15 to 24 years.....	40	19	47.5	27.1
25 to 34 years.....	24	12	50.0	25.8
35 to 44 years.....	20	6	30.0	16.6
45 to 54 years.....	27	2	7.4	9.4
55 to 64 years.....	18	1	5.6	5.1
65 years and over.....	13	.....	.....	1.5
Total.....	142	40	28.2	9.4

TABLE 17B.—*The proportionate mortality from tuberculosis among school teachers during the years, 1908-1910, compared with that of all persons, in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of school teachers in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	School teachers, 1908-1910.	All persons, in Michigan, 1903-1907.
15 to 24 years.....	87	31	35.6	27.1
25 to 34 years.....	63	33	52.4	25.8
35 to 44 years.....	44	10	22.7	16.6
45 to 54 years.....	24	3	12.5	9.4
55 to 64 years.....	26	2	7.7	5.1
65 years and over.....	50	2	4.0	1.5
Total.....	294	81	27.6	9.4

TABLE 17C.—*The proportionate mortality from tuberculosis among printers, for the years, 1908-1910, compared with that of all females in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of printers in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Printers, 1908-1910.	All males in Michigan, 1903-1907.
15 to 24 years.....	29	12	41.4	21.9
25 to 34 years.....	23	10	43.5	23.8
35 to 44 years.....	13	5	38.5	16.1
45 to 54 years.....	18	2	11.1	9.7
55 to 64 years.....	9	.....	.....	5.0
65 years and over.....	18	.....	.....	1.5
Total.....	110	29	26.4	8.4

TABLE 17D.—*The proportionate mortality from tuberculosis among dressmakers for the years, 1908-1910, compared with that of all females in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of dressmakers in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Dress-makers, 1908-1910.	All females in Michigan, 1903-1907.
15 to 24 years.....	50	19	38.0	32.6
25 to 34 years.....	31	16	51.6	27.7
35 to 44 years.....	48	6	12.5	17.1
45 to 54 years.....	45	1	2.2	9.0
55 to 64 years.....	28	1	3.6	5.3
65 years and over.....	36	.....	.....	1.1
Total.....	238	43	18.1	10.6

TABLE 17E.—*The proportionate mortality from tuberculosis among painters, for the years, 1908-1910, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of painters in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Painters, 1908-1910.	All males in Michigan, 1903-1907.
15 to 24 years.....	25	10	40.0	21.9
25 to 34 years.....	60	29	50.0	23.8
35 to 44 years.....	65	15	23.1	16.1
45 to 54 years.....	79	9	11.4	9.7
55 to 64 years.....	87	7	8.0	5.0
65 years and over.....	113	6	5.3	1.5
Total.....	429	76	17.7	8.4

TABLE 17F.—*The proportionate mortality from tuberculosis among teamsters, for the years 1908-1910, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of teamsters in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Teamsters, 1908-1910.	All males in Michigan, 1903-1907.
15 to 24 years.....	49	15	30.6	21.9
25 to 34 years.....	55	11	20.0	23.8
35 to 44 years.....	59	9	15.3	16.1
45 to 54 years.....	79	10	12.7	9.7
55 to 64 years.....	59	3	5.1	5.0
65 years and over.....	69	1	1.5	1.5
Total.....	370	49	13.2	8.4

TABLE 17G.—*The proportionate mortality from tuberculosis among miners, for the years, 1908-1910, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of miners in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Miners, 1908-1910.	All males in Michigan, 1903-1907.
15 to 24 years	212	19	8.9	21.9
25 to 34 years	255	30	11.8	23.8
35 to 44 years	171	21	12.3	16.1
45 to 54 years	106	18	17.0	9.7
55 to 64 years	77	11	14.3	5.0
65 years and over	62	8	12.9	1.5
Total	883	107	12.1	8.4

TABLE 17H.—*The proportionate mortality from tuberculosis among tailors, for the years, 1908-1910, compared with that of all persons in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of tailors in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Tailors, 1908-1910.	All persons in Michigan, 1903-1907.
15 to 24 years	11	3	27.3	27.1
25 to 34 years	22	8	36.5	25.8
35 to 44 years	16	5	31.3	16.6
45 to 54 years	42	7	16.7	9.4
55 to 64 years	46	5	10.9	5.1
65 years and over	94	.....	.....	1.5
Total	231	28	12.1	9.4

TABLE 17I.—*The proportionate mortality from tuberculosis among carpenters, for the years, 1908-1910, compared with that of all males in Michigan, from 1903-1907, by age groups.*

Age at death.	Deaths of carpenters in 1908-1910, due to—		Per cent of all deaths due to tuberculosis among—	
	All causes.	Tuberculosis.	Carpenters, 1908-1910.	All males in Michigan, 1903-1907.
15 to 24 years.....	24	6	25.0	21.9
25 to 34 years.....	67	21	31.3	23.8
35 to 44 years.....	93	23	24.7	16.1
45 to 54 years.....	177	22	12.4	9.7
55 to 64 years.....	282	17	6.0	5.0
65 years and over.....	685	8	1.2	1.5
Total.....	1,328	97	7.3	8.4

DURATION OF SICKNESS IN TUBERCULOSIS.

As stated previously in this report, the time of the inception of the disease is very seldom known, therefore, it is impossible to accurately obtain the information as to the duration of tuberculosis. Owing to this fact this phase of the study was discontinued in 1909, but for the benefit of those who wish to get this information, as gathered in the past years, Table 18 is republished.

TABLE 18.—*The reported duration of sickness in 18,111 fatal and non-fatal cases of tuberculosis, in Michigan, during the fifteen years, 1894-1908.*

Duration periods.	Fatal cases.						Non-fatal cases.		
	Number.			Per cent.			Number.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 month.....	568	483	1,051	3.16	2.69	5.85	6	4	10
2 months.....	413	488	901	2.30	2.72	5.02	10	5	15
3 months.....	493	607	1,100	2.75	3.38	6.13	7	10	17
4 months.....	428	548	976	2.38	3.05	5.43	7	2	9
5 months.....	358	482	840	1.99	2.68	4.67	6	5	11
6 months.....	649	751	1,400	3.62	4.18	7.80	4	4	8
7 months.....	288	438	726	1.60	2.44	4.04	3	4	7
8 months.....	331	426	757	1.85	2.37	4.22	4	5	9
9 months.....	230	416	646	1.28	2.32	3.60	1	5	6
10 months.....	204	280	484	1.14	1.56	2.70	1	1	2
11 months.....	175	237	432	.97	1.43	2.40	3	1	4
Under 1 year.....	4,137	5,176	9,313	23.04	28.82	51.86	52	46	98
1 to 2 years.....	1,860	2,301	4,161	10.36	12.81	23.17	12	19	31
2 to 3 years.....	999	1,170	2,169	5.56	6.52	12.08	4	5	9
3 to 4 years.....	441	483	924	2.46	2.69	5.15	2	3	5
4 to 5 years.....	188	208	396	1.04	1.16	2.20	2	3	5
5 years and over.....	464	532	996	2.58	2.96	5.54	.....	4	4
Totals.....	8,089	9,870	17,959	45.04	54.96	100.00	72	80	152

RESTRICTIVE AND PREVENTIVE MEASURES.

The disinfection of sputa, upon which the restriction of tuberculosis depends, was properly carried out in but forty-two per cent of all the cases which occurred in the years 1904-1911; that is to say, in the majority (fifty-eight per cent) of these cases the tuberculous sick neglected the most important measure for preventing the spread of this disease. Now, while the past thirteen years there has been a downward trend in the death rates from tuberculosis—a reduction undoubtedly due to the observance of the restrictive measures recommended by this Department—yet, the above-mentioned fact that fifty-eight per cent of the tuberculous are still neglecting the destruction of the sputa can only testify that the observance of the preventive measures is by no means as general as it should be, and that the reduction of the disease is not commensurate with the positive knowledge we have regarding the mode of its prevention. This may be explained, partly, by the failure

of a large number of persons to obtain an early diagnosis, and who, therefore, through promiscuous spitting, etc., are sources of spreading tuberculosis. Furthermore, the failure of this fifty-eight per cent to destroy the sputa may be due to lack of co-operation on the part of the physicians and health officers, whereby the tuberculous remain uninstructed regarding the necessary precautions and unsupervised regarding their observance.

That the local board of health and the practicing physicians, in every locality, have a responsibility in the task of suppressing tuberculosis is evident. Again, this fifty-eight per cent undoubtedly contains those cases where both physician and health officer urge the destruction of the sputa, but where the patient, through carelessness, prejudice or poverty, neglects to observe that measure; and for such cases the only effectual control will be institutional care in a hospital conducted for the care of tuberculous.

TABLE 19.—*Restrictive and preventive measures in tuberculosis, in Michigan, in the eight years, 1904-1911.*

Restrictive and preventive measures.	Number of cases.	Per cent.
DISINFECTION OF SPUTA:		
Enforced.....	10,647	*42
Neglected.....	1,056	*4
Not stated or statements doubtful.....	13,759	*54
DISINFECTION OF SOILED BEDDING, CLOTHING, ETC.:		
Enforced.....	13,583	51
Neglected.....	827	3
Not stated or statements doubtful.....	12,257	46
DISINFECTION OF DISCHARGES FROM BOWELS AND BLADDER:		
Enforced.....	706	†49
Neglected.....	308	†21
Not stated or statements doubtful.....	433	†30
DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:		
Enforced.....	13,190	50
Neglected.....	1,433	5
Not stated or statements doubtful.....	12,044	45

*Disinfection of the sputa was not considered necessary in 1,205 instances, in which there was said to be no sputa, or in which the disease was said to be located only in the bowels, stomach, liver, etc., therefore this number has been deducted from the 26,667 cases, reported during the eight years, before making the per cent.

†Disinfection of the bowel discharges was considered necessary in but 1,447 instances, i. e., where the disease was located solely, or in combination with some other organ, in the bowels, or in some other part of the body from which infection might leave the body by way of the bowels or bladder.

BACTERIOLOGICAL DIAGNOSIS IN TUBERCULOSIS.

During the seventeen years, 1895-1911, reports relative to the bacteriological examination of 4,757 samples of sputa of suspected cases of tuberculosis indicate that 94 per cent gave positive and 6 per cent gave negative results.

MENINGITIS IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1911, meningitis was reported present, at some time during the year, from 213 localities, in which there were reported to have occurred 478 cases, including 474 deaths from this disease.

Owing to the fact that, beginning in 1910, tubercular meningitis was compiled as tuberculosis instead of meningitis, as heretofore, the number of cases and deaths from meningitis is, of course, less than in preceding years.

By Table 20, it will be seen that, in 1899, when the statistical study of meningitis was first commenced by this Department, the disease was unusually prevalent, therefore, the average of series of years beginning in 1899 is higher than it would be for similar periods under normal conditions.

Table 20 shows a much greater average death rate from meningitis in the three years in which efforts have been made for its restriction and prevention than the average death rate for a long series of years prior to that time, as shown in Table 21. This is probably due to the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported, and to the fact that the rates in Table 21, do not include tubercular meningitis, which, in recent years, has caused about 15 per cent of all deaths from meningitis.

TABLE 20.—*The prevalence of meningitis, in Michigan, in each of the thirteen years, 1899-1911.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 of the population.
1899.....	2,391,091	1,306	1,079	45.1
1900.....	2,420,982	747	688	28.4
1901.....	2,450,872	614	594	24.2
1902.....	2,475,499	632	598	24.2
1903.....	2,502,758	645	630	25.2
1904.....	2,530,016	598	586	23.2
1905.....	2,557,275	675	646	25.3
1906.....	2,584,533	650	627	24.3
1907.....	2,611,792	680	670	25.7
1908.....	2,639,050	622	612	23.2
1909.....	2,666,309	577	575	21.6
1910.....	2,810,173	522	503	17.9
1911.....	2,856,866	478	474	16.6
Average per year.....	2,576,702	673	637	24.7

*Estimated for intercensal years.

†From many localities only the fatal cases were reported, therefore the figures in this column do not represent the number of cases that actually occurred.

TABLE 21.—*The number of reported deaths from meningitis,* in Michigan, per 100,000 persons living, in each of the thirty years, 1869-1898. Compiled from the Secretary of State's vital statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths.....	1.2	.9	2.0	28.6	62.6	13.9	12.0	8.6	9.3	7.2	6.6	9.7
Years.....	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths.....	19.6	13.0	12.7	12.8	9.2	9.4	9.3	9.6	8.0	8.6	9.6	6.8
Years.....	1893.	1894.	1895.	1896.	1897.	1898.†	Average, 1869-1898.					
Deaths.....	7.8	8.1	7.8	8.3	9.7	28.4	12.0					

*Does not include tubercular meningitis.

†Not all the deaths were reported under the old law, therefore a comparison of death rates for any year subsequent to 1897 with the death rates for any period prior to 1898 would not be reliable. The rates for the twenty-nine years ending with 1897, probably quite accurately represent the annual fluctuations of the disease.

THE PREVALENCE OF MENINGITIS IN URBAN AND RURAL LOCALITIES.

Table 22 shows meningitis to have been present in 1911, in 13 per cent of the incorporated health jurisdictions of the State.

As in the case of pneumonia and tuberculosis, previously considered, meningitis was most prevalent in the large centers of population.

By Table 22A, it may be seen that, in 1911, the urban localities that showed much higher death rates from meningitis than the death rate for this disease for the entire State (16.6 per 100,000 inhabitants) for that year, were: Adrian, Ann Arbor, Battle Creek, Benton Harbor, Calumet township, Detroit, Hancock, Jackson, Laurium, Ludington, Menominee, Monroe, Mt. Clemens, Muskegon, Owosso, Sault Ste. Marie, Traverse City and Wyandotte.

The localities shown in Table 22A, in which the death rates were much lower in 1911 from meningitis than the rate for the entire State for that year were: Cadillac, Escanaba, Flint, Ironwood, Ishpeming, Kalamazoo, Lansing, Marquette, Negaunee and Pontiac.

The localities shown in Table 22A, which showed much higher death rates from meningitis in 1911 than the average for such localities in the years, 1904-1910, were: Ann Arbor, Benton Harbor, Monroe, Mt. Clemens, Muskegon and Owosso.

The localities shown in Table 22A, which showed much lower death rates from meningitis in 1911 than the average for such localities in the years 1904-1910, were: Albion, Alpena, Boyne City, Cadillac, Calumet township, Cheboygan, Coldwater, Detroit, Dowagiac, Escanaba, Flint, Grand Haven, Grand Rapids, Hancock, Hillsdale, Houghton, Iron Mountain, Ironwood, Ishpeming, Kalamazoo, Lansing, Manistee, Marquette, Menominee, Negaunee, Pontiac, Saginaw, St. Joseph, Three Rivers and Ypsilanti.

TABLE 22.—*The prevalence of meningitis in urban and rural localities, in Michigan, in 1911.*

Localities—Grouped according to density of population.	Population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	657,002	3	3	100	164	167	25.4
Cities from 25,000 to 50,000.....	220,746	6	6	100	30	30	13.6
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	15	94	55	53	23.3
Cities and villages from 5,000 to 10,000.....	165,615	23	14	61	28	27	16.3
Cities and villages under 5,000.....	410,698	389	45	12	55	54	13.1
Total urban.....	1,681,399	437	83	19	332	331	19.7
Rural localities (townships)†.....	1,175,467	1,241	130	10	146	143	12.2

*From many localities only the fatal cases were reported, therefore these figures do not represent the number of cases that actually occurred.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 22A.—*The deaths from meningitis in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 22.*

Localities.	1911.			Average, 1904-1910.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian.....	10,777	4	37.1	11,242	3	26.7
Albion.....	5,981	0	.....	5,297	2	37.8
Alpena.....	12,757	2	15.7	12,764	3	23.5
Ann Arbor.....	14,853	11	74.1	14,677	4	27.3
Battle Creek.....	25,776	7	27.2	24,605	5	20.3
Bay City.....	45,920	7	15.2	41,231	8	19.4
Benton Harbor.....	9,599	4	41.7	7,132	1	14.0
Boyer City.....	5,679	0	.....	3,673	1	27.2
Cadillac.....	8,622	1	11.6	7,598	2	26.3
Calumet township.....	20,588	5	24.3	19,542	10	51.1
Cheboygan.....	6,881	2	29.1	6,878	3	43.6
Coldwater.....	5,898	0	.....	6,190	2	32.3
Detroit.....	490,462	137	27.9	360,655	158	43.8
Dowagiac.....	5,202	0	.....	4,637	1	21.6
Escanaba.....	13,543	1	7.4	12,227	4	32.7
Flint.....	42,494	1	2.4	19,119	5	26.2
Grand Haven.....	5,959	0	.....	5,593	1	17.9
Grand Rapids.....	115,380	20	17.3	102,493	28	27.3
Hancock.....	9,472	2	21.1	7,522	4	53.2
Hillsdale.....	5,033	1	19.9	5,189	3	57.8
Holland.....	10,744	2	18.6	9,814	2	20.4
Houghton.....	5,241	0	.....	4,984	1	20.1
Iron Mountain.....	9,321	0	.....	8,323	3	36.0
Ironwood.....	13,288	1	7.5	10,588	3	28.3
Ishpeming.....	12,586	1	7.9	10,867	7	64.4
Jackson.....	32,455	7	21.6	26,240	7	26.7
Kalamazoo.....	41,046	5	12.2	34,042	9	26.4
Lansing.....	33,055	3	9.1	23,872	3	12.6
Laurium.....	8,684	2	23.0	8,856	2	22.6
Ludington.....	9,444	3	31.8	7,562	3	39.7
Manistee.....	12,327	0	.....	11,830	3	25.4
Marquette.....	11,643	1	8.6	11,110	2	18.0
Menominee.....	10,409	3	28.8	10,090	4	39.6
Monroe.....	7,021	2	28.5	6,819	1	14.7
Mt. Clemens.....	7,807	2	25.6	7,479	1	13.4
Muskegon.....	24,590	10	40.7	21,392	6	28.0
Negaunee.....	8,737	1	11.4	6,961	4	57.5
Niles.....	5,242	1	19.1	4,905	1	20.4
Owosso.....	9,721	3	30.9	9,476	2	21.1
Pontiac.....	15,140	1	6.6	12,003	2	16.7
Port Huron.....	18,669	3	16.1	20,328	3	14.8
Saginaw.....	51,160	10	19.5	49,452	14	28.3
St. Joseph.....	6,038	0	.....	5,499	1	18.2
Sault Ste. Marie.....	12,811	5	39.0	12,094	4	33.1
Three Rivers.....	5,265	0	.....	4,273	1	23.4
Traverse City.....	12,213	3	24.6	12,343	3	24.3
Wyandotte.....	8,764	3	34.2	5,964	3	50.3
Ypsilanti.....	6,004	0	.....	7,505	1	13.3

*Estimated for intercensal years.

THE SEASONAL PREVALENCE OF MENINGITIS.

Table 23 is compiled from two different sources, and shows that meningitis was most prevalent in the months of March, April and May and least prevalent in the months of October, November and December.

TABLE 23.—*The seasonal prevalence of meningitis, in Michigan, as indicated by the average number of persons taken sick and who died from this disease in each month in the thirteen years, 1899-1911.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of those taken sick.	38	41	62	58	49	36	39	40	37	33	28	27
Average number of deaths.....	39	49	62	66	57	45	47	47	43	38	34	33

REPORTED SOURCES OF CONTAGIUM AND PREDISPOSING INFLUENCES IN MENINGITIS.

For the reason that, since 1906, the number of instances in which the sources of contagium and predisposing influences in meningitis reported were very small, as compared to the total number of cases of meningitis, health officers were required to supply information only relative to those cases which were traced to former cases of the disease, or which followed the four diseases, shown in Table 24 of this article, which are intimately associated with meningitis.

TABLE 24.—*The reported source of contagium and predisposing influences in meningitis, in Michigan, in the thirteen years, 1899-1911.*

Source and predisposing influences.	Number of instances.
Traced to a former case.....	83
Following an attack in the same person of:	
Influenza.....	161
Pneumonia.....	126
Tuberculosis.....	80
Bronchitis.....	46

INFLUENCE OF AGE AND SEX IN MENINGITIS.

Table 25 confirms what has been said in preceding reports relative to meningitis, that it is essentially a disease of childhood, nearly 57 per cent of the fatal cases in which the age was stated, during the thirteen years, ending in 1911, having occurred in children under five years of age. There was a gradual decrease in the number of deaths corresponding with each increase in age, up to the fiftieth year.

With but two exceptions, ages 5 to 9 and 10 to 14 years, meningitis was more fatal among the male population of all ages shown in the table.

TABLE 25.—*The influence of age and sex in meningitis, in Michigan, as indicated by the number of those, of known ages, who died from this disease in the thirteen years, 1899-1911. Arranged by sex, in age periods of five years each.*

Age periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 5 years.....	2,612	2,057	4,669	31.85	25.09	56.94	201	158	359
5 to 9 years.....	440	459	899	5.37	5.60	10.97	34	35	69
10 to 14 years.....	251	261	512	3.06	3.18	6.24	19	20	39
15 to 19 years.....	255	209	464	3.11	2.55	5.66	20	16	36
20 to 24 years.....	170	137	307	2.07	1.67	3.74	13	11	24
25 to 29 years.....	122	112	234	1.48	1.37	2.85	9	9	18
30 to 34 years.....	105	85	190	1.28	1.04	2.32	8	7	15
35 to 39 years.....	109	82	191	1.33	1.00	2.33	8	6	14
40 to 44 years.....	90	67	157	1.10	.82	1.92	7	6	13
45 to 49 years.....	84	58	142	1.02	.71	1.73	6	4	10
50 years and over.....	274	161	435	3.34	1.96	5.30	21	12	33
All ages.....	4,512	3,688	8,200	55.01	44.99	100.00	346	284	630

THE DURATION OF SICKNESS IN MENINGITIS.

Table 26 shows that of the 4,815 fatal cases of meningitis, in which the duration of sickness was reported, in the eleven years, 1901-1911, 39 per cent of the deaths occurred between the first and fifth days; 64 per cent between the first and tenth days and 78 per cent between the first and fifteenth days.

TABLE 26.—*The duration of sickness in fatal cases of meningitis, of known duration, in Michigan, in the eleven years, 1901-1911. Arranged by sex, in five-day periods.*

Age periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 to 5 days.....	1,091	820	1,911	22.66	17.03	39.69	99	75	174
6 to 10 days.....	610	574	1,184	12.67	11.92	24.59	55	52	107
11 to 15 days.....	358	341	699	7.44	7.08	14.52	33	31	64
16 to 20 days.....	151	161	312	3.14	3.34	6.48	14	13	27
21 to 25 days.....	134	118	252	2.78	2.45	5.23	12	11	23
26 to 30 days.....	60	61	121	1.25	1.27	2.52	5	6	11
31 to 35 days.....	33	29	62	.69	.60	1.29	3	3	6
36 to 40 days.....	22	21	43	.46	.43	.89	2	2	4
41 to 45 days.....	21	14	35	.43	.29	.72	2	1	3
46 to 50 days.....	11	12	23	.23	.25	.48	1	1	2
51 days and over.....	90	83	173	1.87	1.72	3.59	8	8	16
Total.....	2,581	2,234	4,815	53.62	46.38	100.00	234	203	437

RESTRICTIVE AND PREVENTIVE MEASURES IN MENINGITIS.

As may be seen, by reference to Table 27, information relative to the restrictive and preventive measures in meningitis has been very meagre.

As indicated by those reports in which a definite statement was made, relative to the restrictive and preventive measures in meningitis, in the eight years, 1904-1911, only 30 per cent of the patients were isolated from all persons excepting the nurses and attending physicians. Practically the same showing is made in regard to the disinfection of the sputa. The disinfection of bedding, clothing, etc., liable to be soiled by the sputa, was carried out in 50 per cent of the instances, and the disinfection of the rooms was enforced in 58 per cent of the cases.

TABLE 27.—*Restrictive and preventive measures in meningitis, in Michigan, in the eight years, 1904-1911.*

Restrictive and preventive measures.	Number of cases.	Per cent.
ISOLATION:		
Enforced.....	1,467	30
Neglected.....	989	21
Not stated or statements doubtful.....	2,346	49
DISINFECTION OF SPUTA:		
Enforced.....	1,556	*34
Neglected.....	551	*12
Not stated or statements doubtful.....	2,441	*54
DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:		
Enforced.....	2,297	*50
Neglected.....	430	*10
Not stated or statements doubtful.....	1,831	*40
DISINFECTION OF ROOM OCCUPIED BY PATIENT:		
Enforced.....	2,774	58
Neglected.....	538	11
Not stated or statements doubtful.....	1,490	31

*Two hundred and sixty-one cases, in which there was said to be no sputa, excluded in making these percentages.

TYPHOID FEVER IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

By Table 28 it may be seen that, in 1911, typhoid fever, as indicated by the number of cases reported, was much less prevalent than in 1910, while the number of deaths from this disease was less than for any year since 1898.

A comparison of Table 28 with Table 29 will show that the average death rate from typhoid fever in the years since 1884—when active measures for its restriction was instituted by this Department—is considerably lower than in the fifteen years preceding 1884. It will also be seen that, in the years, 1884-1897, inclusive, as a rule, the annual death rates were much lower than the rates in subsequent years. The higher death rates in the years, 1898-1910, may be accounted for, partly, by the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported. It will be seen, however, that, in the fourteen years ending with 1911, the death rates from typhoid fever have not decreased, as would be expected from the efforts put forth by this Department for the restriction of the disease. This is believed to be due to the fact that, in many localities having public water supplies, there has been little, if any, provision made for the removal of the sewage, necessitating a gradually increasing number of cesspools and resulting in a gradually increasing contamination of the underground bodies of water from which many persons in those localities derive their water supplies.

It is safe to say that no substantial decrease in the sickness and mortality from typhoid fever may be expected until every cesspool and shallow well shall have been abolished and every public water supply permanently protected against contamination.

TABLE 28.—*The prevalence of typhoid fever, in Michigan, in each of the twenty-eight years, 1884-1911.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884.....	1,853,658	969	290	27	15.6
1885.....	1,893,697	715	194	23	10.2
1886.....	1,933,735	1,194	282	18	14.6
1887.....	1,973,774	3,424	411	17	20.8
1888.....	2,013,812	1,511	310	21	15.4
1889.....	2,053,851	2,530	681	27	33.2
1890.....	2,093,889	1,924	304	16	14.5
1891.....	2,130,827	4,670	697	15	32.7
1892.....	2,167,765	2,591	538	21	24.8
1893.....	2,204,703	3,512	594	17	26.9
1894.....	2,241,641	2,805	506	18	22.6
1895.....	2,271,531	3,751	621	17	27.3
1896.....	2,301,421	2,506	409	16	17.8
1897.....	2,331,311	1,900	352	19	15.1
1898.....	2,361,201	2,874	634	24	26.9
1899.....	2,391,091	3,194	638	20	26.7
1900.....	2,420,982	5,122	920	18	38.0
1901.....	2,450,872	3,002	665	22	27.1
1902.....	2,475,499	2,456	596	24	24.1
1903.....	2,502,758	2,840	640	23	28.9
1904.....	2,530,016	3,028	731	24	29.7
1905.....	2,557,275	2,774	661	24	25.8
1906.....	2,584,533	3,163	785	25	30.4
1907.....	2,611,792	1,953	645	33	24.7
1908.....	2,639,050	2,656	729	27	27.6
1909.....	2,666,309	2,694	692	26	26.0
1910.....	2,810,173	3,361	681	20	24.2
1911.....	2,856,866	2,660	575	22	20.1
Average per year.....	2,333,001	2,706	564	21	24.2

*Estimated for intercensal years.

†From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

TABLE 29.—*The number of deaths from typhoid fever,* in Michigan, per 100,000 persons living, in each of the fifteen years, 1869-1883. Compiled from reports to the Secretary of State.*

Years.....	1869.	1870.	1871.	1872	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	39.0	48.5	29.2	49.4	52.8	45.8	31.3	30.1	30.3	22.6	25.5
Years.....	1880.	1881.	1882.	1883.	Average, 1869-1883.						
Deaths.....	31.9	55.2	28.4	25.0	36.3						

*Includes typho-malarial fever but not typhoid pneumonia.

GEOGRAPHICAL DISTRIBUTION.

By Table 30 it may be seen that, as compared with the average death rate for the State as a whole for the years 1891-1911 (25.8 per 100,000 population), the disease was unusually prevalent in the counties of Baraga, Chippewa, Delta, Gogebic, Luce, Marquette, Menominee, Otsego and Ingham.

TABLE 30.—*The geographical distribution of typhoid fever, in Michigan, in the twenty-one years, 1891-1911, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.....	255,775	507	86.1	33.7
Alger county.....	5,280	4	.8	15.2
Baraga county.....	4,986	20	2	40.1
Chippewa county.....	19,831	49	8	40.3
Delta county.....	24,610	41	14	56.9
Dickinson county.....	17,646	28	4	22.7
Gogebic county.....	16,877	68	7	41.5
Houghton county.....	62,174	73	13	20.9
Iron county.....	8,369	10	2	23.9
Keweenaw county.....	4,100	4	.6	14.6
Luce county.....	3,318	5	2	60.3
Mackinac county.....	7,978	4	.7	8.8
Marquette county.....	40,311	118	17	42.2
Menominee county.....	25,243	50	12	47.5
Ontonagon county.....	6,854	16	1	14.6
Schoolcraft county.....	8,198	17	2	24.4
NORTHWESTERN DIVISION.....	86,118	120	24	27.9
Benzie county.....	9,899	22	3	30.3
Grand Traverse county.....	21,354	40	7	32.8
Leelanau county.....	10,371	5	2	19.3
Manistee county.....	26,930	27	6	22.3
Wexford county.....	17,564	26	6	34.2
NORTHERN DIVISION.....	77,005	104	20.5	26.6
Antrim county.....	14,439	18	4	27.7
Charlevoix county.....	14,628	14	3	20.5
Cheboygan county.....	16,200	18	3	18.5
Crawford county.....	3,431	5	.5	14.6
Emmet county.....	15,144	25	5	33.0
Kalkaska county.....	6,909	10	2	28.9
Otsego county.....	6,254	14	3	48.0
NORTHEASTERN DIVISION.....	57,855	49	13.5	23.3
Alcona county.....	5,605	4	.8	14.3
Alpena county.....	19,239	14	5	26.0
Iosco county.....	11,161	8	3	26.9
Montmorency county.....	3,184	2	.6	18.8
Ogemaw county.....	7,743	8	2	25.8
Oscoda county.....	1,906	3	.1	5.2
Presque Isle county.....	9,017	10	2	22.2
WESTERN DIVISION.....	276,083	413	77	27.9
Kent county.....	135,430	291	46	34.0
Lake county.....	5,384	6	1	18.6
Mason county.....	19,608	19	6	30.6
Muskegon county.....	37,702	26	7	18.6
Newaygo county.....	18,836	18	5	26.5
Oceana county.....	17,491	23	4	22.9
Ottawa county.....	41,632	30	8	19.2
NORTHERN CENTRAL DIVISION.....	107,411	139	26.2	24.4
Clare county.....	8,802	11	2	22.7
Gladwin county.....	7,210	11	1	13.9
Isabella county.....	23,215	32	5	21.5
Mecosta county.....	25,247	21	6	23.8
Midland county.....	14,212	26	5	35.2
Missaukee.....	9,126	19	3	32.9
Osceola county.....	17,866	17	4	22.4
Roscommon county.....	1,733	2	.2	11.5

*† These footnotes are below Table 28, on a preceding page.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION.....	344,249	379	82.9	24.1
Arenac county.....	8,890	6	9	10.1
Bay county.....	63,740	59	20	31.4
Huron county.....	34,206	28	5	14.6
Lapeer county.....	27,657	31	6	21.7
Saginaw county.....	84,971	71	16	18.8
Sanilac county.....	34,550	47	9	26.0
St. Clair county.....	54,809	99	18	32.8
Tuscola county.....	35,426	38	8	22.6
CENTRAL DIVISION.....	318,043	424	80	25.2
Barry county.....	22,748	21	3	13.2
Clinton county.....	25,409	38	7	27.5
Eaton county.....	31,497	43	7	22.2
Genesee county.....	44,199	58	11	24.9
Grafton county.....	29,747	42	8	26.9
Ingham county.....	43,356	94	16	36.9
Ionia county.....	34,745	41	9	25.9
Livingston county.....	19,211	22	4	20.8
Montcalm county.....	33,654	27	8	23.8
Shiawassee county.....	33,477	38	7	20.9
SOUTHWESTERN DIVISION.....	141,562	156	32	22.6
Allegan county.....	39,182	29	7	17.9
Berrien county.....	48,606	49	12	24.7
Cass county.....	20,533	24	4	19.5
Van Buren county.....	33,241	54	9	27.1
SOUTHERN CENTRAL DIVISION.....	321,530	383	68	21.1
Branch county.....	26,091	28	5	19.2
Calhoun county.....	51,562	67	13	25.2
Hillsdale county.....	29,948	26	6	20.0
Jackson county.....	47,605	78	12	25.2
Kalamazoo county.....	48,154	78	10	20.8
Lenawee county.....	48,785	57	11	22.5
St. Joseph county.....	24,183	19	4	16.5
Washtenaw county.....	45,202	30	7	15.5
SOUTHEASTERN DIVISION.....	483,246	337	122	25.2
Macomb county.....	32,776	37	8	24.4
Monroe county.....	33,084	38	8	24.2
Oakland county.....	49,980	35	8	16.0
Wayne county.....	367,406	227	98	26.7

*†These footnotes are below Table 28 on a preceding page.

THE PREVALENCE OF TYPHOID FEVER IN URBAN AND RURAL LOCALITIES.

Table 31 indicates that, in 1911, typhoid fever was much more prevalent in urban than in rural localities.

In urban localities, typhoid fever was most prevalent in the group of localities of from 10,000 to 25,000 inhabitants and least prevalent in the group of over 50,000 population.

The localities in each of the first four groups in Table 31, together with the reported cases and deaths from typhoid fever in each locality in 1911, and in the average year, are shown in Table 31A.

By Table 31A, it may be seen that, in 1911, the urban localities that showed much higher death rates from typhoid fever than the death rate for this disease for the entire State for that year were: Adrian, Alpena,

Bay City, Benton Harbor, Cadillac, Escanaba, Grand Haven, Grand Rapids, Hancock, Hillsdale, Jackson, Ludington, Marquette, Menominee, Mt. Clemens, Pontiac, Port Huron, Saginaw, Sault Ste. Marie, Traverse City and Ypsilanti.

The localities, shown in Table 31A, in which the death rates from typhoid fever were much lower in 1911 than the rate for the entire State for that year were: Calumet township, Iron Mountain, Ironwood, Kalamazoo, Lansing, Manistee, Monroe and Wyandotte.

The localities, shown in Table 31A, which showed much higher death rates from typhoid fever in 1911 than the average for such localities in the years 1904-1910, were: Albion, Alpena, Benton Harbor, Grand Haven, Hillsdale, Holland, Houghton, Marquette, Mt. Clemens, Pontiac and Ypsilanti.

The localities, shown in Table 31A, which showed much lower death rates from typhoid fever in 1911 than the average for such localities in the years, 1904-1910, were: Battle Creek, Boyne City, Cadillac, Detroit, Escanaba, Flint, Hancock, Ironwood, Kalamazoo, Lansing, Manistee, Negaunee and Wyandotte.

TABLE 31.—*The prevalence of typhoid fever in urban and rural localities, in Michigan, in 1911.*

Localities—Grouped according to density of population.	Estimated Population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	657,002	3	3	100	708	133	20.2
Cities from 25,000 to 50,000.....	220,746	6	6	100	413	50	22.7
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	16	100	274	83	36.5
Cities and villages from 5,000 to 10,000.....	165,615	23	20	87	179	36	21.7
Cities and villages under 5,000.....	410,698	389	146	38*	425	99	24.1
Total urban.....	1,681,399	437	191	44	1,999	401	23.9
Rural localities (townships)†.....	1,175,467	1,241	403	32	661	174	14.8

*From many localities only the fatal cases were reported, therefore these figures do not represent the number of cases that actually occurred.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 31A.—*The deaths from typhoid fever in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 31.*

Localities.	1911.				Average, 1904-1910.			
	Popula- tion.*	Cases.	Deaths.	Deaths per 100,000 inhab- itants.	Popula- tion.*	Cases.	Deaths.	Deaths per 100,000 inhab- itants.
Adrain.....	10,777	†	3	27.8	11,242	6	3	26.7
Albion.....	5,981	4	1	16.7	5,297	5	.6	11.3
Alpena.....	12,757	17	13	101.1	12,764	17	6	47.0
Ann Arbor.....	14,853	11	3	20.2	14,677	10	3	20.4
Battle Creek.....	25,776	8	4	15.5	24,605	42	9	36.6
Bay City.....	45,920	170	19	41.4	41,231	†	18	43.7
Benton Harbor.....	9,599	9	4	41.7	7,132	9	2	28.0
Boyne City.....	5,679	3	1	17.6	3,673	3	.9	24.5
Cadillac.....	8,622	21	3	34.8	7,598	18	4	52.6
Calumet township.....	20,588	5	2	9.7	18,256	17	2	10.2
Cheboygan.....	6,881	6	1	14.5	6,878	5	1	14.5
Coldwater.....	5,898	2	0	.....	6,190	5	.6	9.7
Detroit.....	490,462	421	88	17.9	360,655	†	90	25.0
Dowagiac.....	5,202	1	0	.....	4,637	11	2	43.1
Escanaba.....	13,543	10	6	44.3	12,227	†	22	179.9
Flint.....	42,494	63	9	21.2	19,119	102	14	73.2
Grand Haven.....	5,959	†	2	33.6	5,593	3	.9	16.1
Grand Rapids.....	115,380	222	31	26.9	102,493	340	39	38.1
Hancock.....	9,472	5	3	31.7	7,522	†	4	53.2
Hillsdale.....	5,033	13	2	39.7	5,189	10	1	19.3
Holland.....	10,744	†	2	18.6	9,814	8	1	10.2
Houghton.....	5,241	†	1	19.1	4,984	†	.3	6.0
Iron Mountain.....	9,321	5	1	10.7	8,323	†	1	12.0
Ironwood.....	13,288	2	1	7.5	10,588	†	5	47.2
Ishpeming.....	12,586	7	0	.....	10,867	6	2	18.4
Jackson.....	32,455	71	9	27.7	26,240	69	9	34.3
Kalamazoo.....	41,046	44	4	9.7	34,042	67	9	26.5
Lansing.....	33,055	57	5	15.1	23,872	61	13	54.4
Laurium.....	8,684	0	0	.....	8,856	†	2	22.6
Ludington.....	9,444	28	4	42.4	7,562	10	3	39.7
Manistee.....	12,327	10	1	8.1	11,830	16	3	25.4
Marquette.....	11,643	17	11	94.5	11,110	19	6	54.0
Menominee.....	10,409	22	8	76.9	10,090	†	9	89.2
Monroe.....	7,021	9	1	14.2	6,819	6	1	14.7
Mt. Clemens.....	7,807	†	5	64.0	7,479	†	3	40.1
Muskegon.....	24,590	20	6	24.4	21,392	22	5	23.4
Negaunee.....	8,737	8	2	22.9	6,961	19	3	43.1
Niles.....	5,242	8	0	.....	4,905	7	.9	18.3
Owosso.....	9,721	5	2	20.6	9,476	5	2	21.1
Pontiac.....	15,140	50	8	52.8	12,003	†	4	33.3
Port Huron.....	18,669	44	9	48.2	20,328	28	9	44.3
Saginaw.....	51,160	65	14	27.4	49,452	47	15	30.3
St. Joseph.....	6,038	0	0	.....	5,499	4	2	36.4
Sault Ste. Marie.....	12,811	27	6	46.8	12,094	22	6	49.6
Three Rivers.....	5,265	0	0	.....	4,273	2	.1	2.3
Traverse City.....	12,213	27	4	32.8	12,343	48	5	40.5
Wyandotte.....	8,764	41	1	11.4	5,964	26	6	100.6
Ypsilanti.....	6,004	†	2	33.3	7,505	6	1	13.3

*Estimated for intercensal years.

†Fatal cases only reported.

THE REPORTED SOURCES OF CONTAGIUM IN TYPHOID FEVER.

In the twenty-one years, 1891-1911, over sixty-seven per cent of all the cases of typhoid fever were not traced to their source. This is to be regretted, because if in any outbreak of typhoid fever the source of the

disease is promptly located and removed, and proper measures taken to prevent the further spread of the disease from the sick person, or persons, the disease may usually be restricted to those persons who were infected prior to the recognition of the disease at the beginning of the outbreak.

Of the cases of typhoid fever in which a source of contagium was given, as shown in Table 32, over 56 per cent were said to be due to water or ice. This number would undoubtedly be greater if the sources of all the cases were traced.

The comparatively large number of cases in which the infection was traced to outside jurisdictions included, principally, those cases in which the patients were taken sick in a camp, or other place away from home, and were removed to their homes, or to a hospital, in other health jurisdictions, to be cared for. The removal, from one locality to another, of a person suffering from typhoid fever is a dangerous practice, and is unlawful, unless the same is done with the consent and under the supervision of the health officials of the locality to which the patient is to be removed.

The 2,899 cases which were said to be due to coming in contact with or nursing typhoid fever patients were probably due, in the main, to the neglect of proper precautions on the part of those in attendance upon the patients. Where the utmost care and cleanliness is observed by those in charge of cases of typhoid fever, cases due to secondary infection should be of rare occurrence. It often happens, however, that the nursing is done by some member of the family, who may also handle food, or assist in the preparation of meals, to be eaten by herself and other members of the family; and the hands may not always be disinfected and cleansed between the act of caring for the patient and the handling of the food.

It is probable that many of the cases of typhoid fever which occurred in the same household, camp, etc., and which were reported as due to secondary infection, were really due to the same source as the original case, or to the primary infection.

An insanitary condition of premises, on which a case of typhoid fever occurred, would be considered a cause of typhoid fever only insofar as it might assist in the development and distribution of the germs of the disease. Thus, a badly constructed or neglected privy or cesspool might be an eyesore or a source of discomfort to those in the immediate vicinity and yet not be a cause of typhoid fever. Further, the leachings from such privy or cesspool might find their way into and contaminate the water supply, and the water be consumed without any apparent danger to those using it. But with the entrance to such privy or cesspool of the discharges from a person suffering, or recently recovered, from typhoid fever, these receptacles would then become centers of infection, and a positive danger to those living in their immediate vicinity, and to those using the water from any source into which the leachings from such receptacles might find their way. It is probable that very many of the 1,449 cases of typhoid fever in Table 32, attributed to insanitary surroundings, were due to infected water, and, in some instances, to infected milk or other food.

Cases of typhoid fever due to infected food are difficult to trace, and

it is probable that the one per cent of cases, shown in Table 32, attributed to this source, does not nearly represent the actual number of cases resulting therefrom.

The cases of typhoid fever due to milk infection are probably represented to a considerable extent by the number of deaths from this disease in children under five years of age; and which constitute about four and one-half per cent of all the deaths from this disease.

The transmission of typhoid fever by flies is believed to play a more important part in the spreading of this disease than is generally supposed, but the connection between this source and individual cases of the disease cannot ordinarily be traced by those in charge of the public health service. Whenever a common privy exists, there will always be a possibility of the infection of the contents of the pit by the discharges from an incipient or ambulatory case of typhoid fever, and a strong probability of its infection during, and for some time subsequent to, an outbreak of this disease on the premises where the privy is located. As there is little, if any, effort made to exclude the common house-fly from the common privies, and, in many instances, a very imperfect exclusion of them from our homes; from stores where articles of food are exposed for sale, and from the rooms where cases of typhoid fever are present, the probability of infection of food in the home and in the store is ever present.

It is possible that some of the 29 cases of typhoid fever, shown in Table 32, attributed to infected houses, articles of clothing, etc., were really due to infection in a well, privy or cesspool, rather than to infection in the house itself.

TABLE 32.—*The principal reported sources of contagium in 20,518 cases of typhoid fever, in Michigan, in the twenty-one years, 1891-1911.*

Reported sources.	Number of cases.	Per cent of cases in which the source was known.
Water and ice.....	11,530	56.2
Outside jurisdiction.....	4,239	20.7
Traced to a former case in the same locality.....	2,899	14.1
Insanitary surroundings, defective sewerage, filth, etc.....	1,449	7.1
Milk and other foods.....	283	1.4
Flies.....	89	.4
Infected houses, articles of clothing, etc.....	29	.1
Sources not stated or doubtful.....	42,611	*67.5

*Per cent of all cases that were reported.

RESTRICTIVE AND PREVENTIVE MEASURES.

Table 33 indicates that, in 1905-1911, in a large number of instances, the disinfection of the discharges, and of clothing and other articles soiled by the discharges, of typhoid fever patients, was enforced. This is very gratifying, because it is through the discharges that the disease is spread. This does not, however, include the discharges from patients prior to the recognition of the disease and for some time prior to apparent recovery, nor the discharges from ambulatory cases which are seldom, if ever, recognized, all of which are believed to be fruitful sources of the disease.

The disinfection of rooms in which the patients were sick was enforced in 79 per cent of the cases. This shows a much greater recognition of the importance of this precautionary measure than was reported in any other year.

Judging by the per cent of cases in which the isolation of the patient was enforced, the necessity for this restrictive measure is quite generally recognized. This is also true, though to a less extent, in respect to the placarding of premises. It is sometimes urged that where proper precautions are taken in the care of typhoid fever patients, the isolation of the sick and the placarding of the premises are not necessary. To this, it should be stated, that inasmuch as strict precautions are not always observed in such cases, and for the further reason that many prominent medical men, in this and other countries, are advocates of the theory of the communicability of typhoid fever directly from patient to nurse, and to others who may come in contact with them, members of the family of those sick, other than those who may be in attendance upon the sick, should be excluded from the sick room, and the public should be warned against visiting the houses, and especially against drinking the water from any wells or making use of any outhouses on the premises where the disease is present.

The boiling of the drinking water, in cases where the water supplies were believed to have been the sources of the typhoid fever, was carried out in 65 per cent of the cases. The boiling of suspected water, for drinking and domestic purposes, does not entail much time or labor, and is an absolute safeguard against the communication of typhoid fever through this agency. There is an objection, however, especially in very warm weather, to the drinking of water which has been boiled and thus rendered insipid, but the protection which the boiling affords should more than offset any objection of this nature.

TABLE 33.—*Restrictive and preventive measures in typhoid fever, in Michigan, in the seven years, 1905-1911.*

Restrictive and preventive measures.	Number of cases.	Per cent of all cases.
PLACARDING OF PREMISES:		
Enforced.....	12,115	63
Neglected, not stated or statements doubtful.....	7,146	37
ISOLATION OF SICK PERSONS:		
Enforced.....	15,311	79
Neglected.....	1,457	8
Not stated or statements doubtful.....	2,493	13
DISCHARGES FROM THE BOWELS AND BLADDER:		
Disinfected.....	16,079	84
Not disinfected.....	512	3
Not stated or statements doubtful.....	2,570	13
CLOTHING AND OTHER ARTICLES SOILED BY DISCHARGES:		
Disinfected.....	16,586	86
Not disinfected.....	262	1
Not stated or statements doubtful.....	2,413	13
INFECTED ROOMS:		
Disinfected.....	15,198	79
Not disinfected.....	1,228	6
Not stated or statements doubtful.....	2,835	15
DRINKING WATER:		
Boiled during the period of sickness.....	*1,040	65
Not boiled.....	*419	26
Not stated or statements doubtful.....	*131	9
PROTECTION AGAINST FLIES:		
Houses screened during fly time.....	†8,772	63
Not screened.....	†1,520	11
Not stated or statements doubtful.....	†3,606	26

*These figures represent the number of cases which were definitely traced, or believed to have been due, to drinking infected water.

†Of the 19,261 cases of typhoid fever in the seven years, 1905-1911, 5,363 occurred in months when there were no flies, consequently no necessity for screening; therefore the 5,363 cases are not included in these figures.

DIPHTHERIA AND CROUP IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1911, diphtheria was reported present in 3,308 households, with totals of 3,762 cases and 454 deaths, an average of 1.14 cases and .14 deaths per household.

The number of cases of diphtheria reported in 1911 was greater than in any year since 1898 (shown in Table 34). The number of deaths in 1911 was less than in 1910 and considerably less than the average, while the fatality rate (deaths per 100,000 cases) was less than in any year since the study of this disease by this Department.

By Table 35 it will be seen that, during the years previous to 1884, the death rate from this disease was much higher than in any year since.

THE PREVALENCE OF DIPHTHERIA IN URBAN AND RURAL LOCALITIES.

Table 36 indicates that, in 1911, with the exception of group two, diphtheria was most prevalent in the large centers of population, and least prevalent in the rural localities.

By Table 36 A, it may be seen that, in 1911, the urban localities that showed much higher death rates from diphtheria than the death rate for this disease for the entire State for that year were: Adrian, Calumet township, Detroit, Escanaba, Hillsdale, Houghton, Iron Mountain, Ishpeming, Laurium, Ludington, Menominee, Mt. Clemens, Negaunee, Saginaw and Sault Ste. Marie.

The localities, shown in Table 36A, in which the death rates were much lower in 1911 than the rate for the entire State for that year were: Alpena, Ann Arbor, Benton Harbor, Flint, Grand Rapids, Hancock, Holland, Kalamazoo, Lansing, Muskegon and Port Huron.

The localities, shown in Table 36A, that showed much higher death rates from diphtheria in 1911 than the average for such localities in the years 1904-1910, were: Adrian, Ann Arbor, Battle Creek, Grand Haven, Hillsdale, Laurium, Ludington, Marquette, Menominee, Mt. Clemens, Negaunee, Saginaw and Sault Ste. Marie.

The localities, shown in Table 36A, that showed much lower death rates in 1911 than the average for such localities in 1904-1910, were: Alpena, Calumet township, Flint, Grand Rapids, Hancock, Iron Mountain, Ishpeming, Kalamazoo, Lansing, Muskegon and Port Huron.

As shown in Table 36A, there were no deaths from diphtheria in 1911 in Albion, Boyne City, Cadillac, Coldwater, Dowagiac, Ironwood, Niles, Owosso, St. Joseph, Three Rivers, Traverse City, Wyandotte and Ypsilanti.

TABLE 34.—*The prevalence of diphtheria, in Michigan, during the ten years, 1884-1893, and before the use of antitoxin; also a similar statement for the eighteen years, 1894-1911, since the beginning of the general use of antitoxin.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884.....	1,853,658	3,915	905	23.1	48.8
1885.....	1,893,697	4,018	964	24.0	50.9
1886.....	1,933,735	4,244	982	23.1	50.8
1887.....	1,973,774	3,382	825	24.4	41.8
1888.....	2,013,812	2,228	532	23.9	26.4
1889.....	2,053,851	3,157	683	21.6	33.3
1890.....	2,093,889	4,206	1,050	25.0	50.1
1891.....	2,130,827	4,385	1,002	22.9	47.0
1892.....	2,167,765	4,818	1,099	22.8	50.7
1893.....	2,204,703	4,736	1,092	23.1	49.5
Averages 1884-1893.....	2,031,971	3,909	913	23.4	44.9
1894.....	2,241,641	3,852	744	19.3	33.2
1895.....	2,271,531	3,433	708	20.6	31.2
1896.....	2,301,421	4,013	757	18.9	32.9
1897.....	2,331,311	4,132	756	18.3	32.4
1898.....	2,361,201	2,357	477	20.2	20.2
1899.....	2,391,091	2,154	435	20.2	18.2
1900.....	2,420,982	2,706	528	19.5	21.8
1901.....	2,450,872	2,498	493	19.7	20.1
1902.....	2,475,499	2,993	500	16.4	20.2
1903.....	2,502,758	3,670	569	15.5	22.7
1904.....	2,530,016	3,510	538	15.3	21.3
1905.....	2,557,275	2,159	465	21.5	18.2
1906.....	2,584,533	3,648	453	12.4	17.5
1907.....	2,611,792	2,935	388	13.2	14.9
1908.....	2,639,050	2,658	327	12.3	12.4
1909.....	2,666,309	3,109	397	12.8	14.9
1910.....	2,810,173	3,433	454	13.2	16.2
1911.....	2,856,866	3,762	443	11.8	15.9
Average.....	2,500,240	3,168	524	16.5	21.0

*Estimated for intercensal years.

†From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

TABLE 35.—*The number of deaths from diphtheria and croup, in Michigan, per 100,000 persons living, in each of the fifteen years, 1869-1883. Compiled from reports to the Secretary of State.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	17.0	20.9	22.5	28.2	29.6	26.2	26.9	34.7	50.6	72.8	110.5
Years.....	1880.	1881.	1882.	1883.	Average. 1869-1883.						
Deaths.....	113.9	145.2	102.1	75.7	58.5						

TABLE 36.—*The prevalence of diphtheria in urban and rural localities, in Michigan, in 1911.*

Localities—Grouped according to density of population.	Estimated Population.	Health jurisdictions.			Cases., *	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50, 000.....	657,002	3	3	100	1,722	191	29.1
Cities from 25,000 to 50,000.....	220,746	6	6	100	336	23	10.4
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	16	100	323	37	16.3
Cities and villages from 5,000 to 10,000.....	165,615	23	18	78	256	27	16.3
Cities and villages under 5,000.....	410,698	389	83	21	333	48	11.7
Total Urban.....	1,681,399	437	126	29	2,970	326	19.4
Rural localities (townships)†.....	1,175,467	1,241	260	21	792	117	10.0

*From many localities only the fatal cases are reported, therefore these figures do not represent the number of cases that actually occurred.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 36A.—*The deaths from diphtheria in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 36.*

Localities.	1911.				Average, 1904-1910.			
	Popula- tion.*	Cases.	Deaths.	Deaths per 100,000 inhab- itants.	Popula- tion.*	Cases.	Deaths.	Deaths per 100,000 inhab- itants.
Adrian.....	10,777	28	5	46.2	11,242	10	1	8.9
Albion.....	5,981	2	0	.....	5,297	1	0	.....
Alpena.....	12,757	1	1	7.8	12,764	5	3	23.5
Ann Arbor.....	14,853	19	1	6.7	14,677	11	.7	4.8
Battle Creek.....	25,776	102	4	15.5	24,605	51	3	12.2
Bay City.....	45,920	81	7	15.2	41,231	46	6	14.6
Benton Harbor.....	9,599	2	1	10.4	7,132	8	.6	8.4
Boysie City.....	5,679	0	0	.....	5,673	5	.3	8.2
Cadillac.....	8,622	0	0	.....	7,598	9	1	13.2
Calumet township.....	20,588	6	4	19.4	19,542	27	7	35.8
Cheboygan.....	6,881	5	0	.....	6,878	2	.9	13.1
Coldwater.....	5,898	1	0	.....	6,190	2	.1	1.6
Detroit.....	490,462	1,348	162	33.0	360,655	917	106	29.4
Dowagiac.....	5,202	1	0	.....	4,637	1	0	.....
Escanaba.....	13,543	40	5	36.9	12,227	32	4	32.7
Flint.....	42,494	35	5	11.8	19,119	20	3	15.7
Grand Haven.....	5,959	6	1	16.8	5,593	2	0	.....
Grand Rapids.....	115,380	74	12	10.4	102,493	232	23	22.4
Hancock.....	9,472	3	1	10.6	7,522	†	2	26.6
Hillsdale.....	5,033	4	1	19.9	5,189	.4	0	.....
Holland.....	10,744	5	1	9.3	9,814	.9	1	10.2
Houghton.....	5,241	1	1	19.0	4,984	†	.9	18.1
Iron Mountain.....	9,321	35	2	21.5	8,323	10	4	48.0
Ironwood.....	13,288	5	0	.....	10,588	†	8	75.7
Ishpeming.....	12,586	70	5	39.7	10,867	66	7	64.4
Jackson.....	32,455	69	5	15.4	26,240	39	5	19.1
Kalamazoo.....	41,046	30	1	2.4	34,042	48	3	8.8
Lansing.....	33,055	19	1	3.0	23,872	26	3	12.6
Laurium.....	8,684	4	4	46.1	8,856	†	2	22.6
Ludington.....	9,444	45	4	42.4	7,562	13	2	26.4
Manistee.....	12,327	24	2	16.2	11,830	17	2	16.9
Marquette.....	11,643	7	2	17.2	11,110	15	1	9.0
Menominee.....	10,409	8	2	19.2	10,090	4	.9	8.9
Monroe.....	7,021	8	1	14.2	6,819	16	1	14.7
Mt. Clemens.....	7,807	67	7	89.7	7,479	16	3	40.1
Muskegon.....	24,590	5	1	4.1	21,392	26	3	14.0
Negaunee.....	8,737	63	4	45.8	6,961	19	2	28.7
Niles.....	5,242	1	0	.....	4,905	1	.3	6.1
Owosso.....	9,721	1	0	.....	9,476	6	1	10.6
Pontiac.....	15,140	57	2	13.2	12,003	‡30	2	16.7
Pt. Huron.....	18,669	26	2	10.7	20,328	44	6	29.5
Saginaw.....	51,160	300	17	33.2	49,452	89	9	18.2
St. Joseph.....	6,038	0	0	.....	5,499	2	.4	7.3
Sault Ste. Marie.....	12,811	20	4	31.2	12,094	9	2	16.5
Three Rivers.....	5,265	0	0	.....	4,273	.7	.4	9.3
Traverse City.....	12,213	2	0	.....	12,343	12	6	48.6
Wyandotte.....	8,764	7	0	.....	5,964	‡15	2	33.5
Ypsilanti.....	6,004	0	0	.....	7,505	13	2	26.7

*Estimated for intercensal years.

†Fatal cases only reported.

‡Average for three years only.

§Average for four years only.

WHOOPING-COUGH IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year ending December 31, 1911, whooping-cough was reported present in 1,103 households, with a total of 1,897 cases, including 252 deaths. As the health officers of many localities did not report the non-fatal cases of whooping-cough occurring in their localities, it is impossible to determine the total number of households infected, or the number of cases that occurred in such households.

In 1911, the number of cases of whooping-cough reported exceeded that of any year since 1903, while the number of deaths from this disease was practically the same as in former years.

In studying the fatality rates from whooping-cough, particularly in recent years, the fact should be borne in mind that, prior to 1898, not all deaths were reported; and that while the deaths from whooping-cough are now fully reported, a large number of cases are not reported, making the fatality in recent years much too high.

Table 38 shows the death rates from whooping-cough, as compiled by the Secretary of State, prior to the commencement of the compilation of this disease by the State Health Department. Comparing the death rates prior to 1886 with those since that time, it will be seen that, as a rule, those of the former period were much higher, probably due to the different methods in use in the two departments in the classification of deaths from whooping-cough when complicated with or followed by other diseases induced by it.

TABLE 37.—*The general prevalence of whooping-cough, in Michigan, during the twenty-six years, 1886-1911.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.‡	Deaths per 100,000 of the population.
1886.....	1,933,735	2,642	62	2.3	3.2
1887.....	1,973,774	2,267	59	2.6	2.0
1888.....	2,013,812	2,502	49	2.0	2.4
1889.....	2,053,851	2,694	41	1.5	2.0
1890.....	2,093,889	983	20	2.0	1.0
1891.....	2,130,827	2,360	101	4.3	4.7
1892.....	2,167,765	3,188	77	2.4	3.6
1893.....	2,204,703	4,047	134	3.3	6.1
1894.....	2,241,641	4,555	123	2.7	5.5
1895.....	2,271,531	4,284	109	2.5	4.8
1896.....	2,301,421	5,466	91	1.7	4.0
1897.....	2,331,311	3,978	72	1.8	3.1
1898.....	2,361,201	5,300	267	5.0	11.3
1899.....	2,391,091	6,509	216	3.3	9.0
1900.....	2,420,982	3,397	177	5.2	7.3
1901.....	2,450,872	2,955	118	4.0	4.8
1902.....	2,475,499	3,534	222	6.3	8.9
1903.....	2,502,758	4,172	361	8.7	14.4
1904.....	2,530,016	1,779	141	7.9	5.6
1905.....	2,557,275	1,196	119	9.9	4.7
1906.....	2,584,533	1,364	392	28.7	15.2
1907.....	2,611,792	872	214	24.5	8.2
1908.....	2,639,050	1,248	283	22.7	10.8
1909.....	2,666,309	1,054	213	20.2	8.0
1910.....	2,810,173	1,136	287	25.3	10.2
1911.....	2,856,866	1,897	252	13.3	8.8
Average.....	2,368,334	2,899	162	5.6	6.8

*Estimated for intercensal years.

†From many localities only the fatal cases were reported during many of the years.

‡For the reason that, in many instances, only the fatal cases were reported, these fatality rates are inaccurate.

TABLE 38.—*The number of deaths from whooping-cough, in Michigan, per 100,000 persons living, in each of the seventeen years, 1869-1885. Compiled from the Secretary of State's vital statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	13.9	10.1	5.5	15.1	15.6	11.2	7.2	12.4	8.7	8.5	10.2
Years.....	1880.	1881.	1882.	1883.	1884.	1885.	Average, 1869-1885.				
Deaths.....	16.1	8.4	5.0	5.2	8.8	7.4	10.0				

SCARLET FEVER IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1911, scarlet fever was reported present in 3,704 households in this State, with an aggregate of 5,177 cases, including 197 deaths.

TABLE 39.—*The prevalence of scarlet fever, in Michigan, during the twenty-eight years, 1884-1911.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884.....	1,853,658	2,476	230	9.3	12.4
1885.....	1,893,697	2,750	187	6.8	9.9
1886.....	1,933,735	3,046	275	9.0	14.2
1887.....	1,973,774	3,400	314	9.2	15.9
1888.....	2,013,812	2,989	200	6.7	9.9
1889.....	2,053,851	3,535	166	4.7	8.1
1890.....	2,093,889	3,835	162	4.2	7.7
1891.....	2,130,827	6,212	286	4.6	13.4
1892.....	2,167,765	7,075	487	6.9	22.5
1893.....	2,204,703	6,065	415	6.8	18.8
1894.....	2,241,641	5,500	203	3.7	9.1
1895.....	2,271,531	3,908	125	3.2	5.5
1896.....	2,301,421	2,646	81	3.1	3.9
1897.....	2,331,311	2,482	115	4.6	4.9
1898.....	2,361,201	2,409	100	4.2	4.2
1899.....	2,391,091	4,345	171	3.9	7.2
1900.....	2,420,982	6,734	306	4.5	12.6
1901.....	2,450,872	7,726	298	3.9	12.2
1902.....	2,475,499	6,582	248	3.8	10.0
1903.....	2,502,758	5,353	212	4.0	8.5
1904.....	2,530,016	4,088	228	5.6	9.0
1905.....	2,557,275	2,286	125	5.5	4.9
1906.....	2,584,533	3,066	255	7.3	8.7
1907.....	2,611,792	2,514	167	6.6	6.4
1908.....	2,639,050	3,087	191	6.2	7.2
1909.....	2,666,309	5,153	268	5.2	10.1
1910.....	2,810,173	6,501	302	4.6	10.7
1911.....	2,856,866	5,177	197	3.8	6.9
Average.....	2,333,001	4,318	236	5.2	9.6

*Estimated for intercensal years.

†From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

In 1911, compared with the previous year, there were 922 less households infected, as well as 1,323 less cases and 105 less deaths.

By a comparison of the death rates in Tables 39 and 40 it will be seen that, from 1870 to 1883, inclusive, the average death rate from scarlet fever was much higher than in any year since that time, the highest rate being in the three years prior to the establishment of the State Board of Health.

TABLE 40.—*The number of deaths from scarlet fever, in Michigan, per 100,000 persons living in each of the fifteen years, 1869-1883. Compiled from the Secretary of State's vital statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	22.1	72.0	56.6	44.3	43.9	32.2	30.0	27.4	26.9	27.7	26.3
Years.....	1880.	1881.	1882.	1883.	Average, 1869-1883.						
Deaths.....	22.7	22.8	34.3	37.9	35.1						

PREVALENCE OF SCARLET FEVER IN URBAN AND RURAL LOCALITIES.

As shown in Table 41, the death rate from scarlet fever was greater in the urban than in the rural localities.

By Table 41A, it may be seen that, in 1911, the urban localities that showed much higher death rates from scarlet fever than the death rate for this disease for the entire State (6.9 per 100,000 population) for that year were: Adrian, Benton Harbor, Boyne City, Cadillac, Detroit, Escanaba, Grand Haven, Grand Rapids, Iron Mountain, Ludington, Manistee, Marquette, Monroe, Negaunee, Niles, Owosso and Three Rivers.

The localities shown in Table 41A, in which the death rates were much lower in 1911 than the rate for the entire State for that year were: Bay City, Flint, Kalamazoo and Saginaw.

The localities, shown in Table 41A, that showed much higher death rates from scarlet fever in 1911 than the average for such localities for the years 1904-1910, were: Adrian, Alpena, Boyne City, Escanaba, Grand Haven, Jackson, Ludington, Manistee, Marquette, Menominee, Negaunee, Niles, Owosso and Saginaw.

The localities, shown in Table 41A, that showed much lower death rates from scarlet fever in 1911 than the average for such localities in the years 1904-1910, were: Bay City, Cadillac, Detroit, Iron Mountain, Ironwood, Ishpeming and Lansing.

TABLE 41.—*The prevalence of scarlet fever in urban and rural localities, in Michigan, in 1911.*

Localities—Grouped according to density of population.	Estimated population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Percent of all jurisdictions.			
Cities over 50,000.....	657,002	3	3	100	1,695	74	11.3
Cities from 25,000 to 50,000.....	220,746	6	6	100	432	9	4.1
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	15	94	509	17	7.5
Cities and villages from 5,000 to 10,000.....	165,615	23	20	87	418	15	9.1
Cities and villages under 5,000.....	410,698	389	119	31	612	18	4.4
Total urban.....	1,681,399	437	163	33	3,666	133	7.9
Rural localities (townships)†.....	1,175,467	1,241	388	31	1,511	64	5.4

*From many localities only the fatal cases were reported, therefore these figures do not represent the number of cases that actually occurred.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 41A.—*The deaths from scarlet fever in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 41.*

Localities.	1911.				Average, 1904-1910.			
	Popula- tion.*	Cases.	Deaths.	Deaths per 100,000 inhab- itants.	Popula- tion.*	Cases.	Deaths.	Deaths per 100,000 inhab- itants.
Adrian.....	10,777	12	1	9.3	11,242	2	.4	3.6
Albion.....	5,981	0	0	.....	5,297	4	.1	1.9
Alpena.....	12,757	3	1	7.8	12,764	7	.1	.8
Ann Arbor.....	14,853	27	0	.....	14,677	17	0	.....
Battle Creek.....	25,776	113	0	.....	24,605	36	.4	1.6
Bay City.....	45,920	100	1	2.2	41,231	152	8	19.4
Benton Harbor.....	9,599	2	1	10.4	7,132	19	.8	11.2
Boysie City.....	5,679	23	2	35.2	3,673	5	.3	8.2
Cadillac.....	8,622	7	1	11.6	7,598	12	2	26.3
Calumet township.....	20,588	0	0	.....	19,542	51	5	25.6
Cheboygan.....	6,881	7	0	.....	6,878	6	.3	4.4
Coldwater.....	5,898	38	0	.....	6,190	7	.1	1.6
Detroit.....	490,462	1,241	61	12.4	360,655	745	173	48.0
Dowagiac.....	5,202	2	0	.....	4,637	1	0	.....
Escanaba.....	13,543	83	2	14.8	12,227	5	.6	4.9
Flint.....	42,494	47	2	4.7	19,119	24	.7	3.7
Grand Haven.....	5,959	128	2	33.6	5,593	12	0	.....
Grand Rapids.....	115,380	287	11	9.5	102,493	395	11	10.7
Hancock.....	9,472	1	0	.....	7,522	†	.4	5.3
Hillsdale.....	5,033	13	0	.....	5,189	6	.3	5.8
Holland.....	10,744	1	0	.....	9,814	27	.9	9.2
Houghton.....	5,241	1	0	.....	4,984	1	0	.....
Iron Mountain.....	9,321	3	1	10.7	8,323	18	2	24.0
Ironwood.....	13,288	49	1	7.5	10,588	†	4	37.8
Ishpeming.....	12,586	38	1	7.9	10,867	37	2	18.4
Jackson.....	32,455	45	2	6.2	26,240	36	1	3.8
Kalamazoo.....	41,046	86	2	4.9	34,042	73	2	5.9
Lansing.....	33,055	41	2	6.1	23,872	15	3	12.6
Laurium.....	8,684	0	0	.....	8,856	†	3	33.9
Ludington.....	9,444	20	3	31.8	7,562	4	.3	4.0
Manistee.....	12,327	130	5	40.6	11,830	9	.6	5.1
Marquette.....	11,643	26	4	34.4	11,110	16	.9	8.1
Menominee.....	10,409	25	1	9.6	10,090	†14	.6	5.9
Monroe.....	7,021	4	0	.....	6,819	8	.1	1.5
Mt. Clemens.....	7,807	1	0	.....	7,479	3	.4	5.3
Muskegon.....	24,590	6	0	.....	21,392	86	2	9.3
Negaunee.....	8,737	21	1	11.4	6,961	10	.6	8.6
Niles.....	5,242	87	1	19.1	4,905	6	0	.....
Owosso.....	9,721	29	2	20.6	9,476	3	0	.....
Pontiac.....	15,140	52	1	6.6	12,003	10	.7	5.8
Port Huron.....	18,669	23	0	.....	20,328	36	.9	4.4
Saginaw.....	51,160	167	2	3.9	49,452	40	1	2.0
St. Joseph.....	6,038	0	0	.....	5,499	§4	2	36.4
Sault Ste. Marie.....	12,811	11	0	.....	12,094	10	.4	.3
Three Rivers.....	5,265	2	1	19.0	4,273	3	1	23.4
Traverse City.....	12,213	23	0	.....	12,343	18	.4	3.2
Wyandotte.....	8,764	27	0	.....	5,964	13	1	16.8
Ypsilanti.....	6,004	1	0	.....	7,505	6	.6	8.0

*Estimated for intercensal years.

†Fatal cases only reported.

‡Average for six years only.

§Average for five years only.

MEASLES IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1911, measles was reported present, in this State, in 6,170 households, with a total of 9,639 cases, including 170 deaths.

As only fatal cases were reported from many localities, it was impossible to determine the number of infected households, or the cases occurring therein.

By reference to Table 42 it may be seen that, in 1911, compared with the preceding year, measles was much less prevalent; and compared with the average for twenty-one years, 1890-1910, it was also less prevalent.

TABLE 42.—*The prevalence of measles, in Michigan, during the twenty-two years, 1890-1911.*

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1890.....	2,093,889	11,911	140	1.2	6.7
1891.....	2,130,827	12,173	149	1.2	7.0
1892.....	2,167,765	3,830	76	2.0	3.5
1893.....	2,204,703	7,334	119	1.6	5.4
1894.....	2,241,641	10,518	55	.5	2.5
1895.....	2,271,531	3,870	12	.3	.5
1896.....	2,301,421	15,409	156	1.0	6.8
1897.....	2,331,311	32,543	159	.5	6.8
1898.....	2,361,201	11,614	124	1.1	5.3
1899.....	2,391,091	12,005	166	1.4	6.9
1900.....	2,420,982	20,403	282	1.4	11.6
1901.....	2,450,872	4,629	62	1.3	2.5
1902.....	2,475,499	11,978	162	1.4	6.5
1903.....	2,502,758	8,941	140	1.6	5.6
1904.....	2,530,016	10,386	176	1.7	7.0
1905.....	2,557,275	6,061	111	1.8	4.3
1906.....	2,584,533	7,403	188	2.5	7.3
1907.....	2,611,792	12,139	252	2.1	9.6
1908.....	2,639,050	4,775	121	2.5	4.6
1909.....	2,666,309	9,047	224	2.5	8.0
1910.....	2,810,173	13,934	237	1.7	8.1
1911.....	2,856,866	9,639	170	1.8	6.0
Average.....	2,436,432	10,934	149	1.3	6.1

*Estimated for intercensal years.

†From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

A comparison of the death rates in Table 42 and 43 indicate that, with the exception of the year 1900, as a rule measles was much more prevalent in the years prior to the inauguration, by this Department, in 1890, of active measures for its restriction, than in the years since that time.

TABLE 43.—*The number of deaths from measles, in Michigan, per 100,000 persons living, in each of the twenty-one years, 1869-1889. Compiled from the Secretary of State's vital statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	12.9	4.7	5.5	14.1	18.6	3.4	9.5	8.1	4.1	1.0	10.5
Years.....	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Av. 1869- 1889.
Deaths.....	7.6	15.2	8.7	14.5	7.9	2.0	6.8	14.6	20.6	5.1	9.3

SMALLPOX IN MICHIGAN IN 1911 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1911, smallpox was reported present in 449 households in this State, with an aggregate of 989 cases, including 9 deaths.

As may be seen by Table 44, smallpox was much less prevalent (as indicated by the number of reported cases) than in any year since 1900.

Table 45 shows that the average number of deaths from smallpox, per 100,000 population, for the thirteen years prior to the institution, by this Department, of active measures for the restriction of this disease, was very much greater than the average for the thirty years since that time.

THE PREVALENCE OF SMALLPOX IN URBAN AND RURAL LOCALITIES.

By Table 46 it may be seen that, in 1911, a greater proportion of the rural than urban localities was infected with smallpox, while in 1910 the reverse condition was true. It may also be seen that the case rate (number of cases per 100,000 inhabitants) was much higher in the rural than in the urban localities.

By Table 46A, it may be seen that, in 1911, the urban localities that showed much higher case rates from smallpox than the case rate for the entire State for that year (31.4 per 100,000 population), were: Ann Arbor, Battle Creek, Cheboygan, Jackson, Muskegon, Negaunee and Ypsilanti.

The localities, shown in Table 46A, in which the case rates from smallpox were much lower in 1911 than the rate for the entire State for that year were: Bay City, Cadillac, Detroit, Grand Rapids, Kalamazoo, Lansing, Manistee, Marquette, Pontiac, Saginaw and Sault Ste. Marie.

The locality, shown in Table 46A, that showed a much higher case

rate from smallpox in 1911 than the average for that locality for the years 1904-1910, was, Negaunee.

The localities, shown in Table 46A, that showed much lower case rates from smallpox in 1911 than the average for such localities for the years, 1904-1910, were: Battle Creek, Bay City, Cadillac, Calumet township, Cheboygan, Detroit, Dowagiac, Flint, Grand Rapids, Kalamazoo, Lansing, Manistee, Muskegon, Port Huron, Saginaw, St. Joseph, Sault Ste. Marie and Traverse City.

TABLE 44.—*The prevalence of smallpox, in Michigan, during the thirty years, 1882-1911.*

Years.	Population.*	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1882.....	1,745,298	589	159	27.0	9.1
1883.....	1,799,478	29	2	6.9	.1
1884.....	1,853,658	22	3	13.6	.2
1885.....	1,893,697	27	6	22.2	.3
1886.....	1,933,735	24	7	29.2	.4
1887.....	1,973,774	4	0	.....	.....
1888.....	2,013,812	42	6	14.3	.3
1889.....	2,053,851	57	4	7.0	.2
1890.....	2,093,889	2	0	.....	.....
1891.....	2,130,827	3	0	.....	.....
1892.....	2,167,765	1	1	100.0	.05
1893.....	2,204,703	10	3	30.0	.1
1894.....	2,241,641	285	60	21.1	2.7
1895.....	2,271,531	187	47	25.1	2.1
1896.....	2,301,421	38	16	42.1	.7
1897.....	2,331,311	15	0	.....	.....
1898.....	2,361,201	32	1	3.1	.04
1899.....	2,391,091	139	6	4.3	.3
1900.....	2,420,982	694	9	1.3	.4
1901.....	2,450,872	5,088	31	.6	1.3
1902.....	2,475,499	7,086	40	.6	1.6
1903.....	2,502,758	6,341	33	.5	1.3
1904.....	2,530,016	5,753	24	.4	.9
1905.....	2,557,275	2,985	74	2.5	2.9
1906.....	2,584,533	1,240	3	.2	.1
1907.....	2,611,792	1,712	8	.5	.3
1908.....	2,639,050	2,306	8	.3	.3
1909.....	2,666,309	1,533	4	.3	.2
1910.....	2,810,173	3,319	120	3.6	4.3
1911.....	2,856,866	898	9	1.0	.3
Average.....	2,295,627	1,349	23	3.3	1.0

*Estimated for intercensal years.

TABLE 45.—*The number of deaths from smallpox, in Michigan, per 100,000 persons living in each of the thirteen years, 1869-1881. Compiled from the Secretary of State's vital statistics of Michigan.*

Years.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	Average 1869-81.
Deaths.....	3.7	0.8	6.0	23.7	7.0	1.3	1.8	5.2	6.8	0.4	0.4	0.2	4.9	4.8

TABLE 46.—*The prevalence of smallpox in urban and rural localities, in Michigan, in 1911.*

Localities—Grouped according to density of population.	Population.*	Health jurisdictions.			Cases.	Deaths.	Cases rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	657,002	3	3	100	34	0	5.2
Cities from 25,000 to 50,000.....	220,746	6	6	100	67	4	30.4
Cities from 10,000 to 25,000 and Calumet township (20,588).....	227,338	16	10	63	44	0	19.3
ities and villages from 5,000 to 10,000.....	165,615	23	6	26	30	0	18.1
Cities and villages under 5,000.....	410,698	389	36	9	193	1	47.0
Total urban.....	1,681,399	437	61	14	368	5	21.9
Rural localities (townships)†.....	1,175,467	1,241	91	7	530	4	45.1

*Estimated for intercensal years.

†Exclusive of Calumet Township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 46A.—*Prevalence of smallpox in 1911, and preceding years, in each of the principal localities included in the first four groups in Table 46.*

Localities.	1911			Average 1904-1910.		
	Population.*	Cases.	Cases per 100,000 inhabitants.	Population.*	Cases.	Cases per 100,000 inhabitants.
Adrian.....	10,777	0	.....	11,242	1	8.9
Albion.....	5,981	0	.....	5,297	7	132.2
Alpena.....	12,757	5	31.3	12,764	5	39.2
Ann Arbor.....	14,853	8	53.8	14,677	6	40.9
Battle Creek.....	25,776	28	108.6	24,605	33	134.1
Bay City.....	45,920	1	2.2	41,231	103	249.8
Benton Harbor.....	9,599	0	.....	7,132	.1	1.4
Boyer City.....	5,679	0	.....	3,673	.7	19.1
Cadillac.....	8,622	1	11.6	7,598	5	65.8
Calumet Twp.....	20,588	7	34.0	19,542	11	56.3
Cheboygan.....	6,881	16	232.5	6,878	30	436.2
Coldwater.....	5,898	0	.....	6,190	7	113.1
Detroit.....	490,462	29	5.9	360,655	55	15.3
Dowagiac.....	5,202	2	38.4	4,637	8	172.5
Escanaba.....	13,543	0	.....	12,227	9	73.6
Flint.....	42,494	11	25.9	19,119	56	292.9
Grand Haven.....	5,959	0	.....	5,593	8	143.0
Grand Rapids.....	115,380	3	2.6	102,493	60	58.5
Hancock.....	9,472	0	.....	7,522	0	.....
Hillsdale.....	5,033	0	.....	5,189	3	57.8
Holland.....	10,744	0	.....	9,814	7	71.3
Houghton.....	5,241	0	.....	4,984	0	.....
Iron Mountain.....	9,321	0	.....	8,323	6	7.2
Ironwood.....	13,288	0	.....	10,588	.1	.9
Ishpeming.....	12,586	0	.....	10,867	.1	.9
Jackson.....	32,455	23	70.9	26,240	18	68.6
Kalamazoo.....	41,046	1	2.4	34,042	13	38.2
LaSling.....	33,055	3	9.0	23,872	22	92.2
Laurium.....	8,684	0	.....	8,856	0	.....
Ludington.....	9,444	0	.....	7,562	8	105.8
Manistee.....	12,327	1	8.0	11,830	23	194.4
Marquette.....	11,643	1	8.6	11,110	.8	7.2
Menominee.....	10,409	0	.....	10,090	2	19.8
Monroe.....	7,021	0	.....	6,819	3	44.0
Mt. Clemens.....	7,807	0	.....	7,479	2	26.7
Muskegon.....	24,590	11	44.7	21,392	25	116.9
Negaunee.....	8,737	4	45.8	6,961	2	28.7
Niles.....	5,242	0	.....	4,905	7	143.0
Owosso.....	9,721	0	.....	9,476	23	242.7
Pontiac.....	15,140	1	6.6	12,003	4	33.3
Port Huron.....	18,669	5	26.8	20,328	15	73.8
Saginaw.....	51,160	2	3.9	49,452	137	277.0
St. Joseph.....	6,038	0	.....	5,499	.4	7.3
Sault Ste. Marie.....	12,811	1	7.8	12,094	9	74.4
Three Rivers.....	5,265	0	.....	4,273	1	23.4
Traverse City.....	12,213	4	32.8	12,343	11	89.1
Wyandotte.....	8,764	0	.....	5,964	1	16.8
Ypsilanti.....	6,004	5	83.3	7,505	7	93.3

*Estimated for intercensal years.

POLIOMYELITIS (INFANTILE PARALYSIS) IN MICHIGAN IN 1911.

During the year 1911, poliomyelitis (infantile paralysis) was reported present in 48 localities in the State, with an aggregate of 68 cases, including 35 deaths.

Of the 68 persons taken sick, 29 were males and 39 were females.

In fourteen instances, the average duration of sickness, in non-fatal cases, was 25.0 days.

In nineteen instances, the average duration of sickness, in fatal cases, was 9.3 days.

In fifteen instances, the average age of the males who recovered from this disease was 5.5 years; and in eighteen instances, the average age of the females who recovered was 8.6 years.

In fourteen instances, the average age of the males who died from this disease was 18.5 years; and in twenty-two instances, the average age of the females who died was 6.6 years.

CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1911.

During the year 1911, chicken-pox was reported present in twenty-six localities in the State, 142 households being infected, with a total of 205 cases, none of which proved fatal.

ERYSIPELAS IN MICHIGAN IN 1911.

During the year 1911, reports were received relative to 213 cases of erysipelas in the State, 137 of which proved fatal.

MUMPS (PAROTITIS) IN MICHIGAN IN 1911.

During the year 1911, forty-four cases of mumps (parotitis) were reported to this Department, one death resulting.

TETANUS (LOCK-JAW) IN MICHIGAN IN 1911.

During the year 1911, there were reported to this Department twenty-four cases of tetanus, all of which terminated fatally.

Of the twenty-four cases in which a source of infection was stated,

seven were due to wounds from rusty nails, two to injuries by train, and one each to the following causes: Abscess, sliver in hand, fracture of leg and result of operation.

In twelve instances, the average period of incubation (from time of wound or injury until tetanus developed) was 9.2 days.

In seventeen instances, the average duration of sickness (from time tetanus developed until death occurred) was 4.0 days.

The average age of all persons suffering from tetanus was: for males 25.0 years, and for females 14.0 years.

DISEASES OF ANIMALS DANGEROUS TO MAN, IN MICHIGAN, IN 1911.

Whenever information is received at this office of the occurrence of an outbreak of any disease of animals, which, by reason of its communicability, may be considered dangerous to man, efforts are made to learn all facts relative to such outbreaks. The matter is reported to the State Live Stock Sanitary Commission, and the attention of the health officials of the locality, where the disease is reported present, is called to the fact of its reported prevalence, and they are requested to take immediate measures for the prevention of its spread, by establishing and maintaining quarantine, over the diseased animals until relieved by the State Live Stock Sanitary Commission.

During the year 1911, the three following diseases of this character were reported to this Department:

RABIES (HYDROPHOBIA) IN MICHIGAN IN 1911.

Six outbreaks of rabies among dogs and cattle were reported to this Department in 1911. One person was bitten, resulting in his death.

ACTINOMYCOSIS (LUMPY-JAW) IN MICHIGAN IN 1911.

During the year 1911 two outbreaks of actinomycosis (lumpy-jaw) among cattle were reported to this Department:

GLANDERS (FARCY) IN MICHIGAN IN 1911.

Three outbreaks of glanders (farcy) among cattle were reported to this Department during the year 1911.

ALLEGED NUISANCES IN MICHIGAN IN 1911.

During the year 1911, communications relative to 176 alleged nuisances in Michigan were received at the office of the Secretary of this Board.

The causes to which the alleged nuisances mentioned in the communications were attributed, may be classified as follows:

Privies, 31; dumping refuse on ground, 23; open drains, 22; pollution

of streams, 19; slaughter houses, 15; stagnant water, 13; insanitary buildings, 14; defective sewer, 10; unburied and insufficiently buried animals, 7; insanitary barns, 6; manure piles, 6; pig pens, 6; polluted wells, 4; insanitary meat market, 2 and chicken coops, 2.

Whenever the complaint of an alleged nuisance is received at this office, the health officer, whose duty it is to act, is usually informed of the nature of the nuisance, and is requested to investigate the same. At the same time, the sections of the law and pamphlets, publications of this Board, pertaining to nuisances and to the duty of the local boards of health relative thereto, are sent to him and the person making the complaint.

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